"Dia tak sepenuhnya salah, tetapi dia juga tidak sepenuhnya benar…
Mereka menjadi seperti itu pasti karena lingkungannya…"
-Pangeran Nasution, 2010

Barisan kata-kata itu sudah tentu pernah kita dengarkan dalam keseharian kita. Sebentuk pernyataan yang mengajak kita untuk berefleksi atau berpikir sejenak, bahwa betapa lingkungan merupakan suatu hal yang begitu signifikan keberadaannya menyertai fase kehidupan kita, baik dalam penyertaan biologis, sosial, maupun kultural. Ada yang mengatakan bahwa lingkungan itu hanya ada karena dihuni oleh suatu organisme (hidup tertentu). Oleh karena itu, sepetak ladang adalah lingkungan bagi pertumbuhan dan kehidupan seekor sapi, segumpal kotoran sapi merupakan lingkungan bagi seekor kumbang-kotoran, dan cangkang kumbang-kotoran adalah lingkungan bagi seekor *kutu parasit*. Pengertian lingkungan semacam ini merupakan rumusan dari ilmu-ilmu biologi yang mencoba menunjukkan bahwa tiap kelompok manusia dan individu mempunyai lingkungannya sendiri, dan kemudian masing-masing mereka membentuk bagian lingkungan bagi mahluk lainnya. Lingkungan dalam hal ini secara sederhana juga berarti 'sistem yang meliputi' (*encompassing system*).[1]

Berbagai studi tentang manusia dan lingkungan telah melahirkan bermacam hasil tulisan dengan berbagai kandungan pendekatan dan pemikirannya masing-masing, demi mengungkap bagaimana sebenarnya keterhubungan antara manusia dengan lingkungannya yang sering juga dikatakan sebagai 'ruang hidup' manusia. Dari kalangan ilmuan antropologi misalnya, telah banyak pemikir yang berangkat dari disiplin ilmu ini melakukan berbagai studi dan kemudian mengungkapkan berbagai temuan mereka tentang kehidupan manusia terkait dengan keberadaan lingkungannya. Beberapa hasil pemikiran dari para ahli antropologi itu kemudian menjadi pemikiran yang cukup dikenal dan mempengaruhi cara berpikir masyarakat luas mengenai kehidupan manusia dan lingkungannya, antara lain adalah: ekologi budaya, determinisme lingkungan, posibilisme, ekosistemik, dan etnoekologi.

Beberapa hasil pemikiran tersebut diakui sebagai variasi pendekatan dalam studi antropologi, khususnya antropologi ekologi sebagai lingkup studi yang

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[1] Robin Attfield, 'Etika Lingkungan Global', hlm. 4.

berkonsentrasi pada studi tentang keterkaitan antara kehidupan manusia dan lingkungannya. Sebagai sebuah pendekatan, masing-masing mereka memiliki sejumlah asumsi-asumsi yang melatarbelakangi cara pandang mereka terhadap persoalan dalam studi antropologi ekologi, yang kemudian tentu saja mencirikan bagaimana paparan dalam temuan-temuan studinya. Seperti apakah sejumlah asumsi tersebut, dan bagaimanakah pandangan mereka tentang relasi manusia dan lingkungannya? Hal ini akan menjadi pembicaraan utama dalam tulisan ini yang coba diungkap dengan bahasa sederhana, dan juga lebih sebagai tuturan *'listing'* dengan sedikit penyertaan penalaran, serta kritik pembelajaran yang hadir disana-sini di dalam tulisan.

-Antropologi Ekologi-

"Ecological Anthropology is a subdiscipline of Anthropology for studying cultural and social adaptation which are made by human beings to their environtment" (Ahimsa, 1994:1).

"Ecological anthropology focuses upon the complex relations between people and their environment. Human populations have ongoing contact with and impact upon the land, climate, plant, and animal species in their vicinities, and these elements of their environment have reciprocal impacts on humans. Ecological anthropology investigates the ways that a population shapes its environment and the subsequent manners in which these relations form the population's social, economic, and political life" (Salzman and Attwood 1996:169).

"In a general sense, ecological anthropology attempts to provide a materialist explanation of human society and culture as products of adaptation to given environmental conditions" (Seymour-Smith 1986:62).

A. MAHKLUK HIDUP DAN RELASI JEJARING KEHIDUPAN

Dalam suatu lingkungan hidup, terdapat berbagai tipe mahluk hidup yang saling berhubungan antara satu dengan yang lain, sehingga membentuk suatu kesatuan dari lingkungan hidup tersebut. Mahluk hidup itu adalah kelompok flora (*producer*), fauna (*herbivore* dan *carnivore*; *heterotroph*), mahluk hidup pengurai (*decomposer*), dan juga manusia (*omnivore*; *heterotroph*) yang sering dikatakan sebagai mahluk hidup paling unggul di antara mahluk hidup lainnya. Salah satu hubungan yang paling signifikan dan dengan cepat dapat kita pahami adalah hubungannya dalam

jaringan kehidupan (relasi konsumsi; makanan). Bagaimana hubungan atau interaksi antara mahluk hidup tersebut? Untuk pemahaman yang lebih jelas, dapat diawali melalui skema (siklus konsumsi) berikut ini:
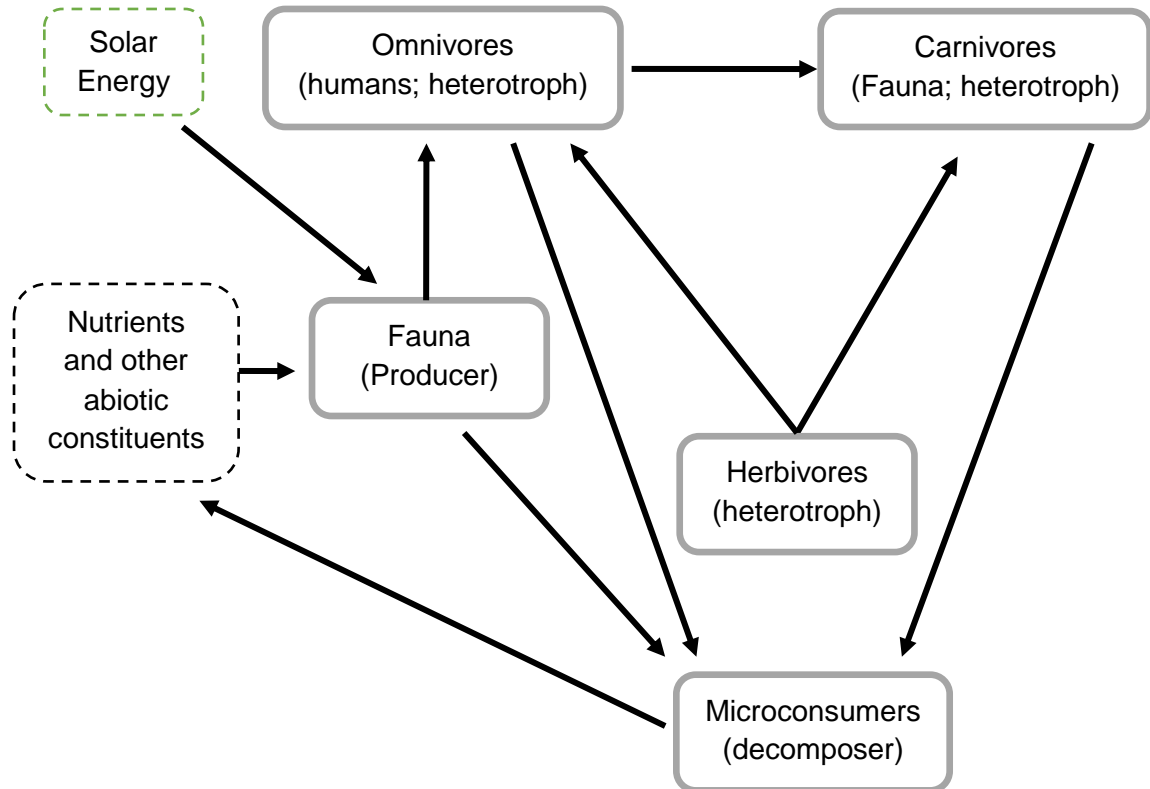
Dari skema di atas, dihasilkan penjelasan mengenai level-level relasi antara *producer*, *heterotroph*, dan *decomposer*; apa saja yang dimakan, dan seberapa besar energi matahari dapat mengambil peranan bagi mahluk hidup. Manusia diketahui memanfaatkan sumber daya makanan dari beberapa level sumberdaya, yang umum diketahui memberikan berbagai bentuk energi yang berbeda-beda, dan biasanya manusia memanfaatkan berbagai bentuk energi itu untuk berbagai kepentingan atau aktivitas kehidupannya.[2]

Producer di sini merupakan suatu spesies yang dapat mengumpulkan (sintesis) makanannya sendiri. Berbagai jenis tanaman (*green plants*)

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[2] Deksripsi analitis atas skema jaringan kehidupan pada beberapa tipe mahluk hidup ini, turut mengacu pada tulisan Mark Q. Sutton dan E.N Anderson, "*Introduction to Cultural Ecology*" (2004: 46-50).

merupakan contoh yang paling umum dari kelompok mahluk hidup *'producer'*. Tanaman menggunakan energi secara langsung dari matahari dan mengkombinasikannya dengan air, gas, dan berbagai mineral, untuk menghasilkan makanan melalui suatu proses yang disebut dengan *'photosynthesis'*. Pada umumnya, kita semua (manusia) dan berbagai mahluk hidup lainnya sangat bergantung pada tanaman untuk menangkap energi matahari (surya) dan kemudian menggantikan energi itu menjadi bentuk persenyawaan, yang dengan itu manusia maupun hewan dapat mengkonsumsi atau memanfaatkannya sebagai udara (pernafasan) kehidupan. Selain tanaman sebagai *producer*, mahluk hidup lain yang akan dibicarakan adalah kelompok mahluk hidup *'heterotrophs'*.

Heterotroph merupakan mahluk hidup yang mengkonsumsi atau memakan mahluk hidup lainnya. Salah satu contoh mahluk hidup ini adalah hewan sapi. Sapi diketahui sebagai mahluk hidup yang memakan tanaman sebagai sumber pemenuhan kebutuhan makanannya. Selain sebagai hewan pemakan, sapi juga merupakan salah satu sumber makanan bagi mahluk hidup pemakan lainnya, yang dalam hal ini sapi adalah makanan bagi manusia. Mahluk hidup *'heterotrop'* tidak memiliki kemampuan untuk secara langsung memanfaatkan energi dari matahari. Mahluk hidup ini hanya mampu memperoleh energi dengan mengkonsumsi mahluk hidup *'producer'* atau mahluk hidup *'heterotroph'* lainnya, sebagaimana telah dipaparkan sebelumnya.

Selain mahluk hidup *'producer'* dan *'heterotroph'*, ada mahluk hidup lain yang tidak kalah penting keberadaannya bagi mahluk hidup yang lainnya, yaitu *'decomposer'* (mahluk pengurai yang secara teknis seperti *heterotroph*, tetapi pada level yang lebih kecil/mikrokonsumer) yang merupakan mahluk hidup dengan ukuran kecil, seperti bakteri misalnya, yang memakan mahluk hidup lain (sudah mati/berupa bangkai). Mahluk hidup ini menghancurkan material-material organik dan kemudian menyediakan nutrisi untuk dikembalikan lagi kepada tanaman. Dalam

sistem kehidupan, nutrisi, energi, dan peredarannya selalu mengacu pada rantai makanan, yang kemudian pada akhirnya akan kembali lagi ke lingkungan (alam) sebagai entitas kehidupan yang telah mati atau dalam kondisi busuk. Tidak seperti energi, nutrisi akan didaur ulang dalam suatu garis edar 'sirkulasi', sehingga akan dapat dimanfaatkan secara terus-menerus selama sirkulasi itu tetap berlangsung.

B. INTERELASI LINGKUNGAN HIDUP: MANUSIA, ALAM, DAN BUDAYA

Lingkungan hidup merupakan suatu kesatuan lingkungan yang terdiri dari lingkungan alam, lingkungan sosial, maupun lingkungan budaya (lingkungan buatan). Lingkungan alam dapat diartikan sebagai suatu lingkungan yang di dalamnya terdapat unsur-unsur biotik maupun abiotik, seperti sungai, pepohonan, tanah, unsur mineral, dan berbagai unsur lainnya. Sementara itu, lingkungan sosial dapat diartikan sebagai suatu lokasi atau tempat di mana terdapat individu-individu manusia yang membentuk suatu kesatuan sosial. Sedangkan lingkungan Budaya (buatan), dapat diartikan sebagai suatu lingkungan yang merupakan hasil karya manusia dan sering terwujud dalam bentuk-bentuk material. Dari pemahaman sederhana tentang tiga jenis lingkungan itu, maka bagaimanakah interelasi antara lingkungan hidup (khususnya lingkungan alam dan budaya) tersebut? Hal ini akan coba dibahas dalam paragraph-paragraph selanjutnya, dengan turut mengacu pada pemahaman tentang naluri dan tindakan (representasi kognisi) dalam kehidupan manusia.

Apa yang terdapat di dalam lingkungan alam, boleh dikatakan merupakan sumber daya bagi manusia dalam rangka menciptakan lingkungan budayanya. Terkait dengan naluri untuk mempertahankan atau melindungi diri, manusia menciptakan salah satu karya dalam lingkungan budayanya, yaitu 'rumah'. Dalam upaya menciptakan rumah, maka manusia membutuhkan perangkat penciptaannya yang notabene

berasal dari lingkungan alam, seperti material tanah sebagai sumber daya utama karena menjadi titik lokasi atau tempat di mana rumah itu akan didirikan. Selain itu, manusia juga membutuhkan sumber daya lain berupa material kayu yang diperoleh dari pepohonan, yang digunakan sebagai pondasi atau kerangka konstruksi rumah. Meskipun kita ketahui bahwa ada material pondasi atau kerangka konstruksi rumah selain kayu yang telah digunakan manusia dalam beberapa abad terakhir (seperti berbagai jenis bebatuan, semen, pasir, dan berbagai material kekinian lainnya), namun tetap saja sumber daya material itu diperoleh dari lingkungan alam. Selain karya budaya (rumah) sebagai tempat pertahanan maupun perlindungan diri, manusia juga memanfaatkan karya budaya ini sebagai situs (tempat) interaksi sosial yang merupakan salah satu naluri kehidupan lainnya pada diri manusia, yaitu naluri untuk 'bergaul'.

Karya budaya lainnya dalam lingkungan budaya manusia adalah perangkat 'penerangan' (listrik) yang memberikan berbagai kemudahan maupun kenyamanan bagi kehidupan manusia. Sumber daya material 'penerangan' ini merupakan perangkat budaya (sebagai hasil kreasi budaya) yang juga diperoleh dari lingkungan alam, seperti air misalnya, yang digunakan sebagai tenaga pembangkit listrik. Selain listrik, perangkat material lainnya yang sangat berperan dalam kehidupan (lingkungan budaya) manusia adalah berbagai jenis bahan bakar cair maupun gas (seperti bensin, solar, avtur, maupun gas), bagi sarana transportasi maupun untuk keperluan berbagai sajian kuliner manusia. Seluruh perangkat material itu dapat diperoleh manusia dari lingkungan alam.

Interelasi antara lingkungan alam dan budaya yang lain adalah interelasi yang berkaitan dengan naluri mencari keindahan dan meniru pada manusia. Naluri mencari keindahan biasanya berkaitan dengan kebutuhan psikologi manusia (seperti aktivitas wisata), sehingga manusia akan melakukan kreasi budaya terhadap lingkungan alam (dengan sumber daya yang berupa potensi panorama atau pemandangan alam), dengan

mendesain sedemikian rupa suatu lingkungan alam menjadi suatu lingkungan budaya yang menyajikan segala potensi panorama maupun pemandangan alam.

Ironisnya, berbagai bentuk interelasi antara lingkungan alam dan budaya itu seringkali berlangsung timpang. Ketimpangan dimaksud adalah dalam hal perilaku manusia yang lebih sering memanfaatkan berbagai sumber daya pada suatu lingkungan alam untuk kepentingan lingkungan budayanya, tanpa berupaya untuk menjaga kelestarian dari suatu lingkungan alam tersebut. Boleh dikatakan hampir seluruh perangkat material atas kreasi budaya manusia dalam melangsungkan keberadaan lingkungan budayanya, merupakan kontribusi dari segala sumber daya yang terdapat pada lingkungan alam. Oleh sebab itu, sudah sepatutnya manusia melakukan suatu tindakan atau perilaku yang menunjukkan kepeduliannya terhadap lingkungan alam. Namun ironisnya, yang terjadi justru sebaliknya, hanya sedikit individu manusia yang menunjukkan kepeduliannya terhadap lingkungan alam, sebagai bentuk interelasi seimbang antara lingkungan alam dengan lingkungan budaya manusia. Interelasi antara lingkungan itu dapat juga dipahami melalui skema interelasi berikut:
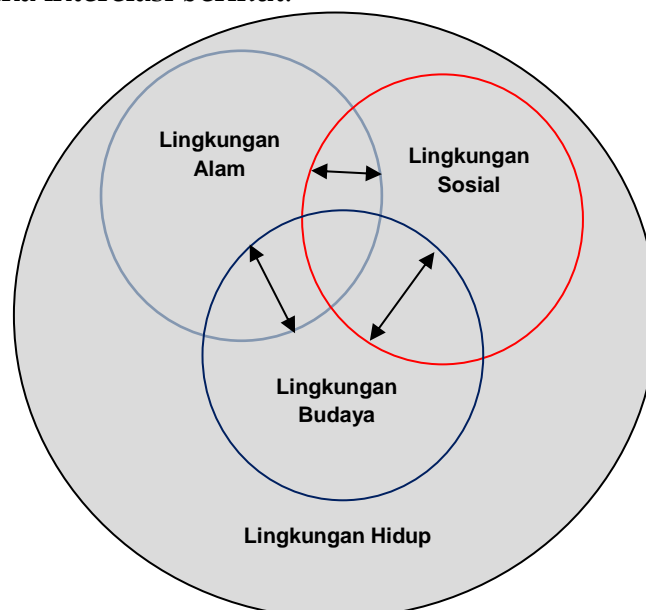
C. PERSPEKTIF TEORETIK/ PENDEKATAN KAJIAN ANTROPOLOGI EKOLOGI

Studi mengenai ekologi dalam disiplin ilmu Antropologi memiliki beragam teori maupun pendekatan. Teori dan pendekatan di dalam antropologi ekologi juga mengalami perkembangan maupun pembaruan secara berkelanjutan. Untuk itu, di sini hanya akan membahas beberapa teori maupun pendekatan saja, tentunya yang dianggap memberi pengaruh besar dalam perkembangan studi-studi antropologi ekologi. Ada dua pendekatan yang dikembangkan dan sangat berpengaruh dalam studi antropologi ekologi, yaitu *Human Ecology* dan *Cultural Ecology*.

1. *Human Ecology*

Pendekatan ini menekankan pada aspek manusia dan kemampuannya dalam berinteraksi dengan lingkungan (alam). Ada beberapa prinsip dasar yang harus diperhatikan dalam membangun kerangka teori dalam pendekatan ini, yaitu:

a) Azas survival seluruh kebudayaan yang berkaitan

b) Gabungan prinsip biologi dan geografi

c) Kebudayaan lokal dapat beradaptasi dengan lingkungan, populasi, dan ekosistem

d) Adaptasi berlangsung pada tingkat/level individu

e) Hubungan antara adaptasi yang berkelanjutan

Dalam perkembangannya, ada suatu kalangan ilmuan antropologi yang menyepakati bahwa pendekatan *human ecology* merupakan pendekatan dalam studi antropologi ekologi, yang penekanannya adalah pada aspek biologis dari manusia dalam mempelajari hubungan atau keterkaitan antara manusia dengan lingkungannya.[3]

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[3] Argumentasi jawaban di sini dikonstruksi melalui telaah pemikiran yang mengacu pada catatan materi perkuliahan Prof. Dr. Kodiran, M.A., pada sesi kuliah "Lingkungan dan Perubahan Sosial Budaya", Maret 2010. –dikombinasikan dengan tulisannya Sutton dan Anderson: *Introduction to Cultural Ecology* (2004: 2-3).

2. *Cultural Ecology*

Salah satu akar dari berbagai studi antropologi ekologi yang telah jauh berkembang pada masa kini, sebenarnya telah tertanam sejak tahun 1930-an oleh Julian H. Steward dalam tulisannya *"The Economic and Social Basis of Primitive Bands"* di tahun 1936. Steward dalam tulisannya, menghadirkan pernyataan "bagaimana interaksi antara kebudayaan dan lingkungan dapat dianalisis dalam kerangka sebab-akibat (*in causal terms*)". Pernyataan teoritis dan metodologis ini kemudian tidak banyak berubah ketika dia menjelaskan secara lebih eksplisit tentang hubungan antara lingkungan dan kebudayaan dalam bukunya *"Theory of Culture Change"* (1955). Dalam buku ini ia menguraikan, mendefinisikan, serta mengembangkan apa yang dia sebut dengan "ekologi budaya" (*cultural ecology*), yaitu ilmu yang mempelajari bagaimana manusia sebagai mahluk hidup (dengan budayanya) menyesuaikan diri terhadap suatu lingkungan geografi tertentu. Dengan demikian, budaya merupakan hal penting yang menjadi perhatian bagi pendekatan ini dalam mempelajari hubugan antara manusia dan lingkungannya (Ahimsa, 1994: 3).

Ekologi budaya Steward. Teori ekologi budaya Steward mengajukan pemikiran; bahwa perbedaan atau persamaan budaya dari pelbagai lingkungan, dapat dilacak dari 'adaptasi' baru yang diperlukan atau dimiliki dengan berupa perubahan teknologi dan pengetahuan produksi (ekonomi). Adaptasi merupakan salah satu hal penting dalam ekologi budaya Steward. Adaptasi di sini bermaksud untuk menjelaskan bagaimana hubungan antara lingkungan (alam) dan manusia. Dengan adaptasi tersebut, Steward mencoba menjelaskan bahwa lingkungan (alam) lokal pada suatu kelompok manusia, komunitas, ataupun masyarakat, bukanlah suatu faktor yang sangat menentukan. Ada hal lain yang menentukan suatu kebudayaan pada suatu kelompok manusia di berbagai tempat (lingkungan) yang berbeda. Meskipun demikian, lingkungan tetap

memiliki hubungan maupun kontribusi atas upaya adaptasi yang dilakukan oleh manusia.

Beberapa hal lain yang cukup menentukan itu oleh Steward disebut dengan 'inti budaya' (*cultural core*). Inti budaya itu adalah: a) teknologi, b) ekonomi, c) penduduk, dan d) organisasi sosial. Keempat aspek ini dikatakannya sebagai inti budaya karena keterhubungannya yang mendapatkan pengaruh langsung dari lingkungan. Terjadinya perbedaan maupun persamaan kebudayaan antara satu kelompok manusia dengan kelompok lainnya, menurut Steward disebabkan oleh keempat inti budaya tersebut. Berbicara mengenai inti budaya, pendekatan ini mendefinisikan inti budaya sebagai "konstelasi fitur yang paling erat kaitannya dengan kegiatan subsistensi dan pengaturan ekonomi". Pendekatan ini berupaya menemukan penyebab perubahan budaya dan berusaha menyusun metode untuk mengenali cara-cara di mana perubahan budaya yang disebabkan oleh adaptasi terhadap lingkungan.

Dengan cara pemahaman yang lain terhadap ekologi budaya Steward, pendekatan ini berupaya menyatakan bahwa ada beberapa unsur pokok dalam kehidupan manusia dan lingkungannya yang menjadi titik perhatian pendekatan ekologi budaya ini. Beberapa unsur pokok itu adalah; "pola-pola perilaku" (*behavioural patterns*), yakni kerja (*work*) dan teknologi yang dipakai dalam proses pengolahan atau pemanfaatan lingkungan. Oleh sebab itu, pemikiran utama dalam studi ekologi budaya adalah mengenai *"the process of work, its organization, its cycles and rhythm and its situational modalities"* (Ahimsa, 1994: 3).

Dalam melakukan studi antropologi ekologi dengan pendekatan ini, ada tiga langkah dasar yang perlu diikuti, yakni: (1) melakukan analisis atas hubungan antara lingkungan dengan teknologi pemanfaatan dan produksi; (2) melakukan analisis atas 'pola-pola perilaku dalam eksploitasi suatu kawasan tertentu yang menggunakan teknologi tertentu'; dan (3) melakukan analisis atas 'tingkat pengaruh dari pola-pola perilaku dalam

pemanfaatan lingkungan terhadap aspek-aspek lain dari kebudayaan'. Tujuan dari pendekatan ini adalah 'untuk menjelaskan asal-usul, ciri-ciri, dan pola-pola budaya tertentu yang tampak di berbagai daerah yang berlainan' (Ahimsa, 1994: 4).

Salah satu studi yang dilakukan oleh Steward sehingga memunculkan pemikirannya atas ekologi budaya adalah penelitiannya mengenai pertumbuhan peradaban di Peru dan Meso di Amerika, yang menghadirkan kesan adanya persamaan kebudayaan pada kedua wilayah tersebut. Atas dasar itu, Steward menyarankan perlunya dikaji keterkaitan hubungan antara teknologi pada suatu kebudayaan dengan lingkungannya; antara lain dengan menganalisis hubungan pola tata kelakuan dalam suatu komunitas dengan teknologi yang dipergunakan, sehingga warga dari suatu kebudayaan dapat melakukan aktivitas mereka dan akhirnya mampu untuk terus melanjutkan kehidupannya. Dari studinya ini, Steward berpendapat bahwa ada hubungan antara teknologi yang dipergunakan dengan keadaan suatu lingkungan tertentu; kemudian pola-pola kelakuan dalam rangka mengeksploitasi suatu daerah, erat kaitannya dengan teknologi yang diciptakan; dan pola-pola kelakuan dalam rangka itu akan berpengaruh terhadap berbagai aspek kebudayaannya (Poerwanto, 2008: 68-69).

Selain ekologi budaya Steward, selanjutnya berkembang beberapa aliran dari pendekatan ekologi budaya, seperti ekosistemik (kultural dan materialistik) dan etnoekologi. Kedua aliran pendekatan ini akan dipaparkan pada paragraph-paragraph selanjutnya. Akan tetapi, khususnya dalam paparan mengenai aliran ekosistemik, hanya akan lebih membicarakan tentang ekosistemik materialistik.

Ekosistemik Materialistik. Istilah pendekatan ini hadir mewakili yang produktif tetapi berlangsung singkat pada sekitar tahun 1960-an, ekosistemik materialistik atau dikenal dengan neofungsionalisme yang dipelopori oleh Andrew P. Vayda dan R.A. Rappaport sebagai bentuk

pengembangan baru yang hadir secara eksplisit pada sistem permodelan tingkat interaksi, terutama memberikan dasar penting bagi kekuatan tekno-lingkungan yang berbicara mengenai ekologi dan kependudukan. Dalam pendekatan ini, kebudayaan direduksi menjadi suatu adaptasi sedangkan perilaku fungsional homeostatik dan deviasi penangkal sehingga berfungsi untuk menjaga suatu sistem besar atas kehidupan manusia dan lingkungan (Bettinger 1996:851).

Sistem ekologi sebagai pendekatan yang digunakan pada kajian-kajian mengenai interaksi manusia dengan lingkungan, juga menghadirkan masalah-masalah berkaitan dengan asumsi dasarnya tentang 'keseimbangan' (*equilibria*) pada suatu ekosistem, dan juga kecenderungannya membatasi analisis pada 'hubungan dengan lingkungan alam secara tertutup'. Kajian dari Suttles Piddocke (McCay, 1978) tentang peranan "pesta *potlatch*" pada 'Indian Kwakiutl', mengungkapkan tentang mekanisme pengaturan keseimbangan dalam sistem populasi manusia dengan kondisi sumber daya. Asumsi keseimbangan seperti ini menurut McCay seringkali hanya menjadi asumsi-asumsi belaka yang cenderung mengabaikan realitas akan disrupsi sistem dan relasi-relasi yang tidak seimbang (McCay, 1978:400).

Kecenderungan membatasi analisis pada lingkungan dekat secara tertutup memunculkan masalah mengenai batas ekosistem. Perilaku biota laut yang bermigrasi, terutama ikan atau predator, mempersulit ditentukannya batas-batas analisis yang sesuai (Cordell, 1974; dalam Lampe, 2006:19).

Kritikan yang lain juga datang terhadap pendekatan ini. Kritik ini menyinggung tentang kecenderungan aliran pendekatan ini yang cenderung memberkati ekosistem dengan sifat-sifat biologis organisme, kecenderungan untuk model-model yang mengabaikan waktu dan perubahan struktural, kecenderungan untuk mengabaikan peran individu,

dan kecenderungan pengakuan stabilitas ekosistem yang berlebihan (Moran, 1990:16).

Meskipun demikian, Rappaport juga memberikan kontribusi penting bagi penerapan metodologi baru pada tahun 1960-an. Mereka memusatkan perhatian pada pendekatan ekosistem, sistem berfungsi, dan aliran energi. Metode ini bergantung pada penggunaan pengukuran seperti kalori dan protein pengeluaran konsumsi. Perhatian diberikan kepada konsep-konsep ekologi berasal dari biologis, seperti daya dukung, faktor-faktor pembatas, homeostasis, dan adaptasi. Pendekatan ekosistem ini tetap populer di kalangan ahli antropologi ekologi selama tahun 1960-an dan 1970-an (Ahimsa, 1994:14).

Etnoekologi. Ahimsa (1997:54) mengatakan bahwa dalam antropologi, pendekatan etnoekologi merupakan salah satu cabang dari aliran Etnosains (*ethnoscience*) yang dipelopori oleh ahli-ahli antropologi dengan latar belakang linguistik yang kuat. Etnoekologi pertama kali diperkenalkan oleh Harold C. Conklin dalam uraiannya mengenai "Sistem perladangan di kalangan orang Subanun di Pulau Mindanao, Philipina".

Ide ini kemudian dikembangkan oleh Charles O. Frake yang menekankan pentingnya pendekatan budaya dalam ekologi. Etnoekologi dapat dikatakan didasarkan pada sejumlah asumsi yang saling berkaitan. Salah satu asumsinya adalah bahwa interaksi lingkungan-manusia pada suatu komunitas atau masyarakat, berbeda dengan suatu komunitas atau kelompok masyarakat lainnya, dan ini sangat dipengaruhi oleh pikiran, pengetahuan, dan bahasa. Dalam suatu konteks dan sebagai respon terhadap rangsangan lingkungan, faktor-faktor yang mempengaruhi tersebut berinteraksi untuk membentuk suatu pandangan dunia yang sangat mempengaruhi bagaimana manusia bertindak. "Orang tidak langsung menanggapi lingkungan mereka sedemikian rupa, tetapi akan lebih dulu memahami hal apa saja yang ada di dalam lingkungan itu:

misalnya, hewan dan tanaman dikonseptualisasikan dalam pikiran mereka dan kemudian diberi label dengan bahasa mereka".

Asumsi selanjutnya, juga masih mengacu pada tulisan Ahimsa (1994:7), bahwa kelompok-kelompok masyarakat atau suatu komunitas dengan budaya yang berbeda, akan melihat dan memahami dunia mereka secara berbeda sebagai akibat dari berbagai aspek sosial, sejarah, budaya, kondisi lingkungan dan pengalaman. Bagaimanapun, ini bukan untuk mengatakan bahwa setiap budaya atau masing-masing masyarakat harus merasakan dan memahami lingkungan dalam cara yang sama sekali unik. Tujuan dan metode dari pendekatan yang merupakan turunan dari etnosains ini adalah untuk melukiskan lingkungan menurut sudut pandang masyarakat tineliti. Pendekatan ini berangkat dari sebuah asumsi utama mengenai lingkungan atau 'lingkungan efektif' (*effective environment*) bersifat kultural sebab lingkungan "obyektif" yang sama, pada umumnya dapat "dilihat" atau "dipahami" (*perceived*) secara berlainan oleh masyarakat yang berbeda latar belakang kebudayaannya.

Selanjutnya dalam tulisan Ahimsa (1994:1997), dikatakan bahwa dalam pendekatan ini, lingkungan dikatakan efektif apabila lingkungan itu memiliki pengaruh bagi pembentukan perilaku manusia, dan memiliki sifat kultural. Dalam hal ini, selain lingkungan merupakan suatu lingkungan fisik, tetapi juga telah mengalami penafsiran melalui sistem pengetahuan dan nilai tertentu. Suatu lingkungan telah mengalami penafsiran, dinamakan *"ethnoenvironment"* atau *"cognized environment"* yang dikodifikasi dalam bahasa, sehingga untuk memahaminya kita harus memberikan perhatian pada bahasa sehari-hari masyarakat yang diteliti. Ungkapan "bahasa mencerminkan budaya" memang tepat dalam konteks ini. Sistem pengetahuan suatu masyarakat mengenai lingkungan tersebut terwujud dalam bentuk berbagai klasifikasi, kategorisasi dan taksonomi unsur-unsur lingkungan. Oleh karenanya, berbagai konsep dan istilah yang menunjukkan klasifikasi mengenai lingkungan, pada dasarnya

merupakan akses terbaik guna mencapai sistem pengetahuan tentang lingkungan. Dengan demikian, untuk memahami lingkungan tersebut kita harus dapat menemukan dan mengungkapkan taksonomi-taksonomi, kategorisasi serta klasifikasi-klasifikasi yang ada dalam istilah-istilah lokal, sebab dalam taksonomi dan klasifikasi inilah terkandung pernyataan-pernyataan atau ide-ide masyarakat yang kita teliti mengenai lingkungannya.

Apa yang dikemukakan oleh Ahimsa di atas, sejalan dengan apa yang dikemukakan oleh Anderson (dalam Muhammad Arifin, 2003), bahwa para etnoekologis menekankan deskripsi pada lingkungan *"perceptual"* atau *"cognized"* pada kebudayaan spesifik sebagai suatu strategi penelitian dengan maksud: pertama, *"to describe what people know about nature"*; kedua, *"to describe how people use this knowledge to get along in the world"*. Pendekatan etnoekologi merupakan salah satu pendekatan tertentu yang berbeda dengan pendekatan lainnya dalam antropologi ekologi, dengan demikian pendekatan ini mempunyai ciri tertentu yang lain dari pendekatan lainnya. Dalam hal ini, Anderson menunjukkan empat (4) ciri pendekatan etnoekologi, antara lain: (1) etnoekologi menekankan pada *"perceptual environment"*; (2) etnoekologi dimaksudkan mendeskripsikan secara emik domain budaya, meliputi *"perseptual environment"*. Secara mendasar, etnoekologi bermaksud menganalisis semantik secara formal; (3) analisis etnoekologi dibatasi pada keterhubungan ekologis yang bersifat *intra cultural*; (4) sepanjang etnoekologi berkaitan dengan lingkungan efektif, hal ini dimaksudkan untuk melakukan evaluasi dan prediksi efek dari kemungkinan perilaku yang bervariasi dalam partisipasi lingkungan mikro, yaitu lingkungan yang sering kali dibatasi untuk masyarakat lain (dalam Arifin, 2003).[4]

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[4] Muhammad Arifin, Lembo, Simpukng, dan Sipungk Klasifikasi Hutan dan Kebun Secara Tradisional Orang Dayak Benuaq, Tunjung dan Pasir di Kalimantan Timur (Suatu Studi Etnoekologi), www.ekonomirakyat.org. 2003 (diakses pada 1 Juni 2010).

Selain itu, Ahimsa (1997:55) kembali mengingatkan, bahwa dengan perhatian khusus terhadap aspek pengetahuan atau kognitif, pada gilirannya akan sangat membantu (peneliti) dalam mengamati gejala-gejala sosial yang berkaitan dengan masalah ekologi, sembari melakukan analisis atas pelbagai pandangan dari orang-orang yang terlibat di dalamnya.

D. EKOSISTEM BAGI KEHIDUPAN BIOLOGI MANUSIA DAN PERILAKU BUDAYA

Ekosistem merupakan kesatuan hidup yang terdiri dari suatu komunitas mahluk hidup dari berbagai jenis, dengan berbagai benda mati yang berinteraksi membentuk suatu sistem. Oleh sebab itu, tentu saja ekosistem akan berimplikasi terhadap kehidupan manusia, terlebih pada aspek biologis manusia dan perilaku budayanya. Seperti apakah implikasi ekosistem tersebut? Hal ini akan coba dibahas dalam paragraph-paragraph selanjutnya.

Sutton dan Anderson (2004:36-37) mengatakan bahwa ekosistem merupakan suatu sistem yang memiliki keterikatan secara geografis, atau suatu sistem yang terbentuk dari keberadaan dan keberinteraksian sekelompok organisme yang terdiri dari komponen abiotik maupun biotik pada suatu lingkungan (alam). Terkait dengan aspek biologis manusia dan keterikatannya dengan suatu ekosistem, implikasi signifikan yang muncul adalah mengenai asupan kebutuhan biologis manusia (makanan, air, dan juga udara) yang mau tidak mau, akan dan harus disesuaikan dengan keberadaan ekosistem serta di lingkungan (alam) mana manusia itu berada.

Untuk menemukan implikasi signifikan itu, khususnya mengenai asupan kebutuhan makanan bagi manusia, ada baiknya jika merujuk pada studi yang dilakukan oleh C. Geertz mengenai sistem pertanian di Indonesia, karena dalam studinya, Geertz ada menjelaskan bagaimana implikasi ekosistem terhadap aspek biologis manusia dan perilaku budayanya.
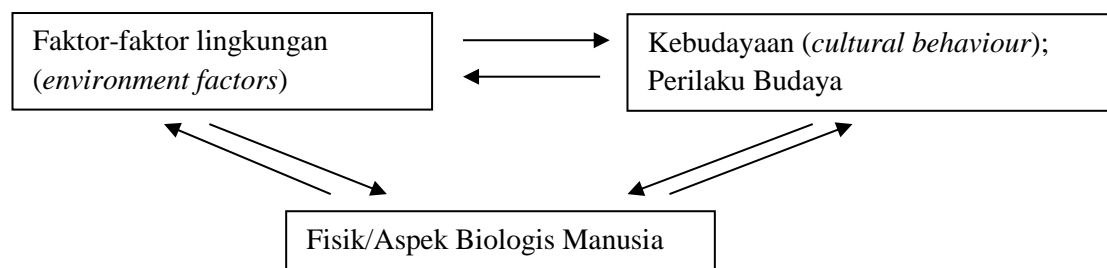
Dalam studinya ini, Geertz mencoba membandingkan dua tipe ekosistem di Indonesia untuk melihat implikasi ekosistem terhadap aspek biologis manusia dan perilaku budayanya. Tipe ekosistem pertama adalah ekosistem dengan ciri tanah yang cenderung kering, yang disebutnya dengan karakter *swidden* (perladangan). Karakteristik ekosistem ini merupakan sistem lingkungan dengan plot hamparan perladangan yang mensimulasi satu kondisi lingkungan alam. Tipe ekosistem ini merupakan suatu ekosistem di mana indeks keragaman spesiesnya (tumbuhan dan hewan) cukup tinggi, sehingga energi (pasokan makanan) yang diproduksi oleh sistem ini didistribusikan di antara sejumlah besar spesies yang berbeda, dan masing-masing diwakili (dikonsumsi) oleh sekelompok individu manusia dalam jumlah yang relatif kecil (Geertz, 1963, dalam Vayda, 1979: 4-5).
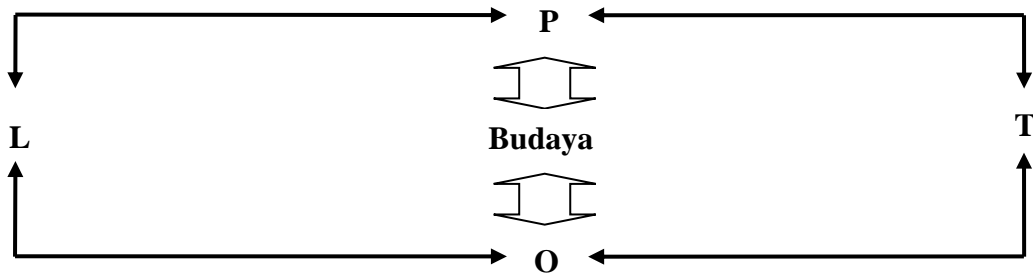
Karakter ekosistem seperti ini menurut Geertz akan lebih banyak menawarkan beragam sumber makanan bagi manusia. Dengan demikian, perilaku budaya yang berlangsung pada suatu kelompok manusia dengan karakter ekosistem seperti ini akan lebih sederhana. Perilaku budaya di sini berkaitan dengan cara manusia dalam memenuhi kebutuhan biologis (makanan), seperti penggunaan teknologi/alat dalam berladang, dan juga organisasi sosial yang berkaitan dengan pengorganisasian manusia dalam upaya pemenuhan kebutuhan biologisnya (aktivitas berladang maupun dalam berburu binatang). Kesederhanaan dalam perilaku budaya yang terbentuk pada suatu kelompok individu manusia tersebut, berlangsung karena karakter ekosistem ini menawarkan banyak kemudahan bagi mereka untuk mendapatkan pasokan makanan (Geertz, 1963, dalam Vayda, 1979: 5-8).

Sebaliknya, pada tipe ekosistem yang kedua, dengan ciri tanah yang relatif harus sering dalam keadaan basah, kemudian indeks keragaman spesies (tumbuhan dan hewan) yang relatif lebih kecil, menyebabkan perilaku budaya manusia dengan karakter ekosistem ini menjadi lebih

kompleks dan menuntut intensitas ketepatan maupun ketekunan yang lebih besar dibandingkan pada perilaku budaya dengan karakter ekosistem sebelumnya. Karakter ekosistem dengan indeks keragaman spesies yang rendah menyebabkan sumber energi (pasokan makanan) tidak didistribusikan oleh banyak spesies (tumbuhan maupun hewan). Untuk itu, manusia harus meningkatkan perilaku budayanya agar mampu menyediakan pasokan makanan yang mencukupi tuntutan kebutuhan biologis mereka. Perilaku budaya ini berkaitan dengan modifikasi teknologi/alat yang digunakan dalam pertanian, dan juga penerapan model pengorganisasian yang tepat dalam aktivitas pemenuhan kebutuhan biologis mereka. Pada tipe ekosistem kedua ini, Geertz menyebutnya dengan ekosistem yang bercirikan hamparan persawahan. Dengan demikian, aktivitas pemenuhan kebutuhan biologis manusia dengan karakter ekosistem seperti ini adalah dengan perilaku budaya 'bertani sawah' (Geertz, 1963, dalam Vayda, 1979: 17-19).

Dari apa yang telah dipaparkan dalam paragraph-paragraph sebelumnya, ditemukan implikasi dari ekosistem terhadap aspek biologis manusia dan perilaku budayanya juga berkaitan dengan persoalan pertumbuhan populasi manusia, kemudian juga berkaitan dengan keberadaan lingkungan yang menunjukkan adanya saling ketergantungan fungsional di antara komponen-komponen itu yang mengukuhkan keberadaan suatu ekosistem. Pemahaman atas implikasi ekosistem juga dapat ditelusuri melalui ilustrasi berikut:

| Faktor-faktor lingkungan (*environment factors*) | → ← | Kebudayaan (*cultural behaviour*); Perilaku Budaya |

Fisik/Aspek Biologis Manusia

Faktor lingkungan memberi peluang untuk perkembangan unsur-unsur kebudayaan dengan menggunakan 'akal' dan 'budhi' manusia, untuk memanfaatkan, mengubah bentuk, jumlah maupun lokasi faktor-faktor lingkungan tersebut. Akan tetapi, perlu diperhatikan bahwa dengan segala potensi yang diberikan lingkungan kepada manusia, dalam rangka upaya pemanfaatan lingkungan, harus mengacu pada '3 S' (selaras, serasi, dan seimbang), yang meliputi tatanan pemikiran, peristiwa, maupun setiap tindakan atau perilaku manusia dalam aktivitas pemanfaatan lingkungan tersebut.

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HUBUNGAN MANUSIA DAN LINGKUNGAN
DALAM KAJIAN ANTROPOLOGI EKOLOGI

Oleh : Zainal Arifin[1]

abstract

In many anthropological report, the importance of human relationship with its environment is emphasized. These studies assume that social behavior always has an important meaning in its relation with the environment. In the past decades the study of human relationship with its environment underwent some different emphasizes in its approach. This article tries to describe the development in ecological anthropology approach and its variation of methods in its study.

Dalam banyak laporan antropologi, kajian tentang hubungan manusia dengan lingkungan adalah suatu hal yang penting. Kajian ini berasumsi bahwa perilaku sosial selalu mengandung makna penting atas hubungan mereka dengan lingkungannya. Dalam perkembangannya, kajian tentang hubungan manusia dengan lingkungan mengalami pasang surut pendekatan. Tulisan ini mencoba menggambarkan perkembangan pendekatan antropologi ekologi dan pasang surut kajiannya.

A. Pendahuluan

Kajian tentang hubungan manusia dan lingkungannya lebih banyak ditekankan pada tema adaptasi. Pandangan ini dalam antropologi mengalami pasang surut pendekatan. Pandangan terakhir tentang pola hubungan ini mencoba menjelaskan bahwa pola hubungan manusia dan lingkungannya tidak selalu bertujuan menjaga homeostatis (keseimbangan). Ini bergerak dari pandangan bahwa walaupun adaptasi tertentu kelihatannya baik untuk jangka waktu pendek dan bijaksana di mata masyarakat bersangkutan, tetapi dalam jangka waktu panjang justru terlihat merugikan keseimbangan lingkungan, kesehatan manusia, bahkan merugikan masa depan satuan sosio-kultural tersebut.

Untuk memahami perilaku-perilaku responsif seperti ini, dari sudut antropologi harus juga melihatnya sebagai suatu perangkat proses psikologis yang mungkin universal atau hampir universal, sekaligus

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suatu perangkat respon perilaku baru yang diadaptasikan pada situasi-situasi dan waktu-waktu tertentu. Oleh sebab itu antropologi harus mengetahui institusi-institusi dan tradisi-tradisi, untuk bisa menentukan mengapa manusia melakukan sesuatu pada waktu dan tempat tertentu. Disamping itu, pengetahuan manusia tidak akan pernah menjawab semua persoalan. Selalu harus dipertimbangkan kemungkinan munculnya hal-hal baru dalam situasi tertentu, dan suatu ketidak pastian mendasar yang bisa muncul karena banyaknya respons yang bisa diberikan oleh manusia. Ada sejumlah generalisasi pada tahapan kultural dan institusional mengenai sebab-musabab penyalahgunaan lingkungan oleh manusia, tetapi tidak merata di setiap masyarakat atau setiap waktu. Sementara masalah penyalahgunaan adalah lebih banyak merupakan masalah perilaku.

Masalah lain yang menjadi sorotan dalam antropologi ekologi adalah perbedaan antara fungsi pengendalian pada tahapan individu, kelompok, dan masyarakat. Pengendalian kebutuhan-kebutuhan individual dipandang tidak relevan bagi pengendalian sumber alam oleh kelompok atau masyarakat, karena dalam mengendalian penggunaan sumber alam, suatu kelompok atau masyarakat bisa saja menyalahgunakan sumber alam lainnya. Lagi pula pemanfaatan yang rendah oleh individu bisa mengakibatkan pemanfaatan yang tinggi oleh kelompok masyarakat, atau sebaliknya.

B. Perkembangan Kajian Antropologi Ekologi

1. Determinisme

Determinisme, muncul pada akhir abad 19 dan awal-awal abad 20 dari para penganut gagasan-gagasan Darwin, penalaran deduktif, dan hubungan sebab akibat linear yang sederhana. Pendekatan ini nampaknya juga menghasilkan cara untuk mengolah dan menginterpretasi data mengenai keanekaragaman manusia yang waktu itu semakin bertambah banyak dan membanjiri kalangan ilmiah Eropa. Pendekatan ini berasumsi bahwa lingkungan fisik (alam) adalah pendorong utama dalam kehidupan manusia. Dengan kata lain, perkembangan pola kehidupan suatu masyarakat dalam bentuk kebudayaan dipandang sebagai pengaruh yang dimunculkan oleh lingkungan alamnya.

Pendekatan ini dalam bentuk paling murni dan paling negatif dianut dan disebarluaskan oleh ahli geografi Huntington dan Carlson, yang mencoba memperlihatkan bagaimana pengaruh dominan iklim dan cuaca pada sejarah umat manusia. Pendekatan determinisme ini kemudian cepat mendapat perlawanan. Karya J.W. Fewkes (1896): *The Tusayan Ritual : A Study of The Influence of Environment on Aboriginal Cults* mengkritik perspektif tersebut dengan tegas. Menurut Fewke "... *sangatlah menyedihkan apabila lingkungan dianggap sebagai kata kunci untuk menunjukkan pola hu-*

bungan manusia dan lingkungan tersebut ...". Fewke menunjuk pada salah satu ritual masyarakat Tusayan, yang menurutnya demikian plastisnya hingga ia mengikuti iklim, tetapi menurutnya "... ada unsur-unsur di dalamnya yang ditimbulkan oleh sebab-sebab lain yang belum jelas ...". Ini kemudian menimbulkan rasa antipati pada para ahli antropologi ekologi Inggris maupun Amerika. Mereka bahkan tidak mau mempertimbangkan kemungkinan bahwa faktor-faktor lingkungan dapat berpengaruh pada kebudayaan.

2. Posibilisme

R eaksi terhadap determinisme mulai membuat kaum antropologi ekologi mencoba menemukan solusi pendekatan baru dalam mengkaji masalah hubungan manusia dan lingkungan. Laporan Fewkes di atas, kemudian disebut-sebut sebagai awal munculnya perspektif baru yaitu *posibilisme*. Posibilisme memandang bahwa walaupun lingkungan mungkin mempengaruhi pola-pola kebudayaan dengan menghadirkan berbagai kendala, tetapi lingkungan sendiri tidak bisa menciptakan fenomena-fenomena sosio-kultural. Dengan kata lain, mengikuti Fewke, "ada sebab-sebab lain" yang menjembatani pola hubungan antara fenomena sosio-budaya dengan lingkungan alamnya. Pandangan seperti ini kemudian digambarkan oleh Forde (1934) dimana "...pada penduduk di kawasan yang kondisi geografinya sama, sering terlihat

perbedaan besar dalam hasil kebudayaannya. Untuk itu maka antara lingkungan fisik dan kegiatan manusia selalu ada unsur tengah, yaitu suatu kumpulan tujuan dan nilai-nilai spesifik, suatu kumpulan pengetahuan dan keyakinan. Dengan kata lain adanya suatu pola kebudayaan...".

Pandangan seperti ini banyak mengesankan ahli antropologi seperti Boas, di mana dari kajian-kajian komparatif tentang kebudayaan yang berbeda yang mendiami suatu lingkungan tertentu membuktikan bahwa pola-pola sosio-kultural yang sama juga muncul pada keadaan lingkungan yang berbeda. Contoh klasik perspektif ini adalah kajian Kroeber (1939) tentang pengaruh hambatan iklim pada pembudidayaan jagung penduduk beriklim dingin.

Pendekatan ini lalu mendapat kritik bahwa pola hubungan antara manusia (kebudayaan) dan lingkungannya sebenarnya tidak dapat disederhanakan begitu saja, karena pola hubungan itu bersifat kompleks. Disamping itu, pengaruh-pengaruh kebudayaan sebagai jembatan antara fenomena sosial-budaya dan lingkungan alam sering dijadikan suatu 'daerah gelap' di antara manusia dan lingkungannya di mana segala sesuatunya dapat terjadi" (Vayda dan Rappaport (1968).

3. Ekologi Kebudayaan

P endekatan ini hampir berbarengan dengan suatu kecendrungan pada tahun-tahun sebelum perang di Amerika, yaitu suatu pemi-

kiran holistik dan popularitas timbal balik fungsional antara ciri-ciri kebudayaan. Salah satu sumbangan terpenting adalah dari Julian Steward dengan tulisannya *The Theory of Culture Change* (1955).

Asumsi dasar pendekatan ini bahwa faktor-faktor lingkungan memiliki potensi positif dan kreatif dalam proses-proses kultural. Bergerak dari asumsi ini, maka Steward kemudian memfokuskan perhatian pada segi-segi khusus interaksi antara sejumlah faktor kebudayaan dengan lingkungan terbatas. Bergerak dari konsep holisme dan integrasi fungsional, Steward berargumen bahwa penelitian harus memfokuskan perhatian pada apa yang ia sebut *cultural core* (inti kebudayaan) yaitu unsur-unsur budaya yang sangat berpengaruh dalam interaksinya dengan lingkungan tersebut.

Tujuan umum dari ekologi budaya Julian Steward adalah untuk menjelaskan asal usul, ciri-ciri dan pola budaya tertentu yang tampak menjelaskan asal usul, ciri-ciri dan pola budaya diberbagai daerah yang berlainan. Lebih khusus lagi yaitu berusaha menentukan apakah penyesuaian diri berbagai masyarakat manusia pada lingkungannya memerlukan bentuk-bentuk perilaku tertentu, ataukah penyesuaian diri tersebut bersifat luwes. Dengan kata lain apakah penyesuaian diri tersebut masih memberikan ruang dan kemungkinan pada berbagai pola perilaku lain yang mungkin diwujudkan. Pendekatan ini mempunyai beberapa implikasi metodologi yang

penting, diantaranya adalah menghendaki tipe analisis yang lebih dinamis, sehingga pertanyaan terpenting pada dasarnya adalah "apa saja unsur-unsur penentu atau faktor-faktor pengendali tersebut". Unsur-unsur penentu tersebut berarti mengkaji interaksi spesifik antara kebudayaan dan lingkungannya.

Di sini terlihat bahwa metode 'ekologi budaya' Steward memperlihatkan penekanan materialistiknya. Metode ini mencakup kajian hubungan antara ciri lingkungan tertentu dengan ciri kebudayaan tertentu dari kelompok-kelompok orang yang hidup dalam lingkungan tersebut. Di bidang lingkungan, Steward menitik beratkan kwalitas, kwantitas, dan distribusi sumberdaya. Sedangkan segi kebudayaan, yang paling penting di selidikinya adalah tekhnologi, pengaturan ekonomi, organisasi sosial dan demografi, walaupun ia juga mengikut sertakan aspek-aspek lainnya.

Steward menekankan bahwa lingkungannya mempengaruhi unsur-unsur tertentu dari kebudayaan, yang disebutnya *culture core* (inti budaya). Unsur-unsur kebudayaan lain dipengaruhi oleh proses-proses otonom sejarah kebudayaan yang dibahas oleh pengikut Boas. Steward terutama berminat menemukan apa yang disebutnya 'unsur-unsur yang berulang secara teratur' atau persamaan-persamaan antara kebudayaan-kebudayaan yang berulang kali muncul di daerah atau tradisi yang secara historis terpisah, dan

yang dapat dijelaskan sebagai hasil dari ciri lingkungan yang sama.

Walaupun demikian ada paradoksal antara penekanan Steward dengan operasionalisme penelitiannya. Penekanan penelitian yang harus spesisik dan terpusat ini begitu produktif pada tingkat tertentu, tetapi sekaligus juga mengekang secara halus pada tingkat yang lain. Lagipula Steward tidak konsisten dan eksplisit merumuskan pranata-pranata dan unsur-unsur budaya mana yang termasuk di dalam "inti budaya" tersebut (Harris, 1968). Kalau seandainya sistem mata pencaharian yang dianggap paling menentukan, apakah hal ini tidak mengakibatkan jenis data sosio-kultural dan lingkungan lainnya terabaikan. Disamping itu pendekatan Steward tidak mempertimbangkan bahwa kebudayaan mungkin dapat mempengaruhi lingkungan dengan cara yang kelak akan merugikan manusia. Pandangan ini mendapat perhatian yang cukup besar di kemudian hari oleh Bennett (1976), Dimbleby (1972), dan Grossman (1977).

4. Etnoekologi dan Ekologi Sistemik

E tnoekologi dan ekologi sistemik pada hakekatnya sangatlah jauh perbedaannya, tetapi muncul hampir bersamaan dan sekarang menjadi pendekatan antropologi ekologi yang sangat berkembang hampir dalam dua dasawarsa terakhir. Pendekatan etnoekologi banyak berasal dari *etnosains*, yang

melukiskan lingkungan sebagai mana dilihat oleh masyarakat yang diteliti. Untuk memahami lingkungan ini kita harus mengungkapkan taksonomi-taksonomi dan klasifikasi-klasifikasi yang ada dalam istilah-istilah lokal. Karena dalam taksonomi-taksonomi dan klasifikasi inilah terkandung pernyataan-pernyataan atau ide-ide masyarakat yang kita teliti mengenai lingkungannya. Setelah taksonomi dan klasifikasi diketahui, maka langkah selanjutnya adalah memformulasikan aturan-aturan perilaku terhadap lingkungannya akibat sistem klasifikasi yang dilakukan, sehingga sesuai dan dianggap tepat oleh masyarakat yang kita teliti.

Pendekatan etnoekologi telah menghasilkan data yang sangat baik dan terperinci tentang bagaimana orang dalam suatu masyarakat yang berbeda mengklasifikasikan lingkungan mereka (Conklin, 1954; Frake, 1962; Gladwin, 1970). Salah satu penelitian yang memakai pendekatan ini antara lain dapat dilihat dalam laporan Johnson (1974) yang membandingkan pandangan yang dianut beberapa petani "tebang-bakar" di Brazil mengenai kecocokan jenis-jenis tanah tertentu untuk jenis tanaman hasil bumi tertentu.

Pendekatan ini --- dan juga pendekatan ekologi sistemik --- kemudian dikritik, karena hanya sedikit membantu memahami bagaimana orang benar-benar akan bertindak dalam situasi-situasi tertentu (Harris 1968). Vayda dan Rappaport (1968) melihat pendekatan ini cenderung

menjadi "etnosistematik" atau "etno-taksonomi" yang kering dan kurang berkembang. Walaupun perspektif ini menghasilkan beberapa kajian yang baik, tetapi secara keseluruhan perspektif ini tidak mengenai sasaran sebab sering didasarkan atas data (pengklasifikasian) yang tidak memadai dan tidak sesuai.

Bersamaan dengan berkembangnya pendekatan etnoekologi, banyak juga peneliti periode ini berusaha menunjukkan bahwa gejala-gejala sosio-kultural mempunyai fungsi adaptif terhadap lingkungan; atau setidak-tidaknya mempunyai fungsi dimana faktor-faktor lingkungan dimanipulasi dalam pola mata pencaharian masyarakat bersangkutan. Pendekatan ini disebut sebagai perspektif "ekologi sistemik", atau sering disebut juga sebagai perspektif "neo-fungsionalisme".

Istilah neo-fungsionalisme digunakan karena pengikut pendekatan ini memandang organisasi sosial dan kebudayaan populasi spesifik sebagai adaptasi fungsional yang memungkinkan populasi-populasi itu mengeksploitasi lingkungan mereka tanpa melampaui daya dukung lingkungan tersebut. Pendekatan ini sedikit berbeda dengana pendekatan fungsi lainnya dalam ilmu-ilmu sosial, karena satuan yang digunakan adalah suatu populasi dan bukan satuan sosial (social order). Pendekatan ini juga berbeda dengan adaptasi dalam ekologi biologi, karena pendekatan ini mempelajari populasi dan bukan individu-individu sebagai satuan yang beradaptasi dengan lingkungannya.

Sedikit berbeda dengan Steward, secara umum neo-fungsionalisme menjelaskan aspek-aspek spesifik organisasi sosial dan kebudayaan dengan meninjau fungsi aspek tersebut dalam proses mengadaptasikan populasi setempat pada lingkungan mereka. Pendekatan ini juga mengambil populasi lokal dan bukannya kebudayaan-kebudayaan sebagai satuan analisis. Mereka lebih menyelidiki interaksi antara lingkungan dan populasi daripada memperlakukan lingkungan sebagai latar belakang pasif yang membentuk kebudayaan tetapi tidak terpengaruh olehnya, dan metode mereka lebih eksplisit, ketat dan kwantitatif daripada metode pada perspektif sebelumnya.

Salah satu penelitian dengan pendekatan ini dapat dilihat pada laporan Rappaport (1968) tentang upacara *kaiko* pada masyarakat suku Tsembaga dan siklus pengorbanan babi di mana ia menggunakan model ekosistem lengkap dengan implikasi umpan balik negatifnya yang menghasilkan keseimbangan fungsional atau homeostatis. Menurut Rappaport, ritual *kaiko* menandai suatu periode damai antara orang-orang Tsembaga dengan lawan mereka, suatu perdamaian yang secara ritual dirayakan dengan menanam *rumbin* atau pohon-pohon keramat di setiap desa. Bila pohon-pohon *rumbin* ini dicabut oleh kedua belah pihak, siklus *kaiko* berakhir dan permusuhan dimulai kembali. Untuk

mencabut pohon-pohon *rumbin*, diperlukan suatu pesta penyembelihan babi, dimana dagingnya harus dibagikan kepada semua yang hadir. Di sini Rappaport memperlihatkan bahwa ritual ini memainkan peranan penting dalam pengaturan berbagai variabel ekosistemik, termasuk didalamnya jumlah babi yang dipelihara, luas tanah, dan frekuensi peperangan.

Karya Rappaport ini dan juga banyak karya-karya ekosistemik lainnya kemudian dikritik Friedman (1974) Menurut Friedman, kajian jenis ini hanya memberikan deskripsi, tetapi tidak menjelaskan kelakukan sosial dari manusia pelakunya itu sendiri. Lagi pula tidak satupun dalam kajian ini, fungsi adaptif yang ditonjolkan betul-betul dibuktikan dengan data empiris. Dengan kata lain, apa yang disajikan bukan pernyataan berdasarkan observasi, dan kita hanya diberi sesuatu yang pada dasarnya merupakan suatu deskripsi mengenai hubungan-hubungan imaginer dimana fungsi bukannya didemontrasikan melainkan diasumsikan ada (Friedman, 1974). Kemudian masalah memasukkan keseimbangan (homeostatis) pada sistem-sistem yang dideskripsikan bisa bersifat implisit maupun eksplisit seperti dalam penggunaan sibernetika dan umpan balik negatif Rappaport dan beberapa karya yang lainnya.

Secara umum persoalan-persoalan yang muncul sebagai akibat penerapan perspektif ini, diantaranya adalah: (1) Pemikiran neo-fungsional yang dianggap menyesatkan,

karena mereka keliru dalam usaha membela pandangan bahwa populasi manusia selalu berada pada atau dibawah daya dukung lingkungan. (2) Banyak penulis perspektif ini cenderung berasumsi bahwa aspek-aspek organisasi sosial dan kebudayaan tertentu mempunyai fungsi spesifik dalam mengadaptasikan penduduk lokal pada lingkungan mereka. (3) Pandangan yang keliru bahwa energi menjadi faktor yang membatasi pertumbuhan penduduk atau kompleksitas sosial. Karena dalam banyak kasus seperti yang ditunjukan Thomas (1973), kebijakan pemerintah ternyata juga sangat mempengaruhi akses populasi ke faktor-faktor produksi. (4) Populasi lokal sebagai satuan kajian, sulit untuk ditentukan batas-batasnya dan cenderung terlibat dalam jaringan hubungan sosial, ekonomi, dan politik yang lebih luas. (5) Asumsi bahwa populasi-populasi lokal berada dalam keseimbangan (homeostatis) sulit untuk dievaluasi kebenarannya, karena untuk itu diperlukan kerangka waktu yang panjang.

5. Transisi Ekologi

Pada tahun 1975, Vayda dan McCay mengusulkan bahwa ahli ekologi (dan dalam arti lebih luas ahli antropologi ekologi) jika menyorot gangguan dan bahaya-bahaya hubungan manusia dan lingkungan, harus mengambil respons individu terhadap masalah-masalah ini sebagai titik tolak penelitian mereka. Kelemahan pada pendekatan neo-

fungsional dan perspektif sebelumnya, yang sering mengabaikan penyelidikan terhadap individu-individu, maka pendekatan baru ini mengacu pada pentingnya kajian-kajian diakronik dalam antropologi ekologi dan kebutuhan meneliti mekanisme-mekanisme perubahan. Kajian ini sering disebut juga sebagai kajian "transisional" atau "prosesual" karena mereka berusaha mengatasi perpecahan yang terjadi pada tahapan antropologi ekologi antara kerangka waktu yang pendek dengan kerangka waktu yang sangat panjang. Atau lebih konkritnya, mereka meneliti pergeseran dan perubahan dalam aktifitas individu dan kelompok, dan menyoroti mekanisme-mekanisme lewat mana tingkah laku dan kendala ekstern saling mempengaruhi. Pendekatan ini seperti juga perspektif sebelumnya lebih menyelidiki interaksi populasi dan lingkungan daripada memperlakukan lingkungan sebagai latar belakang pasif dari populasi.

Pada tingkat tertentu, pendekatan ini melenyapkan perdebatan mengenai hubungan lingkungan-manusia (kebudayaan). Lingkungan dan kebudayaan sebagai satuan tersendiri yang terpisah hilang sama sekali dan kebudayaanlah yang lewat transisi ekologi tetap bertahan dan menghadirkan masalah-masalah masa kini. Ini mungkin kesudahan logis dari suatu pendekatan yang dengan sadar bersifat interaksional. Pendapat bahwa perubahan dan adaptasi dalam sistem adalah hasil keputusan-keputusan para individu

tidak baru dalam antropologi dan telah digunakan dalam kerangka ekologi dengan hasil yang cukup baik. Bennet (1969) dan Moorman (1968) menerapkan ide ini dalam penelitian respons-respons individual dan kelompok yang berbeda terhadap pilihan-pilihan agraris di Great Plains yang modern dan di Thailand. Menurut Bennet, manusia lewat kebudayaannya yang semakin kompleks, secara tetap telah memasukkan lingkungan ke dalam kebudayaan, dan kita sekarang berada pada titik di mana alam dan kebudayaan sudah menjadi satu. Proses inkorporasi inilah yang disebut Bennet "transisi ekologi" atau dengan istilah Orlove "ekologi prosesual", atau dalam istilah Vayda dan McCay "pendekatan problem". Karena ini pada hakekatnya adalah masalah-masalah kebudayaan, maka hanya lewat kebudayaanlah permasalahan tersebut dapat dipecahkan.

Dalam bukunya *The Ecological Transition* (1976), Bennet menggunakan istilah Steward tentang ekologi budaya *(cultural ecology)* untuk menggambarkan pendekatan yang menurutnya dapat mencapai tujuan tersebut. Pendekatan ini pada dasar-nya merupakan suatu fokus antropologi pada ekologi dan bencana ekologis melalui kebudayaan dan pengendalian kebudayaan dalam rangka kebijakan sosial dan pengelolaan lingkungan. Relevansi antropologi sekarang, menurut Bennet terletak dalam kenyataan bahwa ia dapat memberi sumbangan tidak saja untuk pemahaman bagaimana ke-

budayaan "bekerja", tetapi juga untuk perencanaan masa depan dan untuk menjadikan pengawasan institusional hal yang tidak saja dapat diterima bahkan menggembirakan (Bennet, 1976).

Model-model yang didasarkan pada pelaku, mempunyai beberapa keuntungan dibandingkan dengan model-model sebelumnya. Model ini dapat menjelaskan lebih banyak jenis organisasi sosial; memungkinkan analisis tolak ukur tingkah laku dan variasi tingkah laku populasi yang lebih akurat; penyelidikan terhadap konflik dan persaingan menjadi lebih mudah; dan menawarkan potensi untuk menyelidiki hubungan-hubungan ekonomi, politik, dan sosial.

Ada dua tipe model yang diperkenalkan yaitu model mikro-ekonomi dan model kognitif atau naturalistik. Model mikro-ekonomi mirip dengan model-model penentuan pilihan dalam ekonomi. Pelaku-pelaku yang harus memilih di bawah pengaruh berbagai kendala, mengalokasikan sumber-sumber daya yang tidak seberapa banyaknya menurut serangkaian tujuan atau hirarki tujuan tertentu. Model-model jenis ini diterapkan pada situasi-situasi dengan ketidakpastian dan ambiguitas yang lebih besar, dengan jenis-jenis alternatif dan pilihan kurang dijabarkan. Alternatif-alternatifnya dapat dibedakan baik dengan variabel kontinyu maupun yang berdiri sendiri-sendiri, dan banyak tolak ukur bisa mempengaruhinya.

Berbeda dengan penekanan neo-fungsional pada sistem-sistem dimana totalitas-totalitas dan variabel-variabel totalitas diberi tempat yang lebih penting daripada individu-individu, maka model-model prosesual cenderung memperlakukan variabel-variabel lingkungan sebagai bagian dari sejumlah kendala eksternal yang relatif statis dan individu-individulah yang bereaksi dan menyesuaikan diri terhadapnya. Kecenderungan ini terutama kuat dalam kajian-kajian yanag menyorot area-area kecil dalam jangka waktu yang pendek. Disamping itu, model prosesual ini membuka jalan bagi antropologi ekologi untuk menyelidiki faktor-faktor yang paling berperan dalam mempengaruhi tingkah laku individu-individu dan totalitas-totalitas.

Sedangkan model kognitif yang dipinjam dari antropologi kognitif, mencoba menggambarkan proses-proses psikologis dalam proses pengambilan keputusan dengan mencari alternatif-alternatif kognitifnya dan prosedur-prosedur untuk memilih alternatif-alternatif tersebut. Model ini cenderung digunakan untuk menganalisis konteks-konteks yang mengharuskan orang memilih dari sejumlah kecil alternatif, sering atas dasar pertimbangan status sosial. Model-model ini memberi kaitan yang sangat berguna antara kajian sistem klasifikasi dan tingkah laku sebenarnya. Model ini sering diterapkan pada situasi-situasi dimana alternatif-alternatif terbatas dan lebih sering dapat dibedakan berda-

sarkan variabel-variabel yang berdiri sendiri daripada variabel yang kontinyu. Tolak ukur-tolak ukur yang mempengaruhi pilihan-pilihan cenderung sedikit jumlahnya, dan hasil pilihan-pilihan sudah pasti atau hampir pasti. Bennet menggunakan konsep "proses" dengan cara yang agak umum untuk menunjuk pada rangkaian atau kontinuitas prilaku dengan kekuatan kognitif ini; dan istilah "menanggulangi" serta "strategi" untuk menunjuk unit-unit yang renggang keterikatannya dengan "proses" tersebut.

Berdasarkan alasan ini, maka perlu dibedakan adaptasi antara tahapan individual dan tahapan kelompok atau masyarakat. Kalau individu yang diambil, maka kita berhadapan dengan proses-proses prilaku dan istilah kunci disini adalah menanggulangi (*coping*). Maksudnya, seperti telah disebutkan, individu yang bersangkutan cuma berhadapan dengan keadaan dengan maksud mendapatkan apa yang dibutuhkan atau diinginkannya, atau menyesuaikan diri dengan situasi (perubah secara aktif dan secara pasif). Kalau prilaku suka menanggulangi itu menjadi suatu pola atau rangkaian perilaku, dan sebab itu dapat diteruskan pada orang lain, maka dalam hal ini orang bisa berbicara tentang strategi-strategi atau stategi-strategi adaptif. Strategi-strategi menanggulangi dan adaptif pada hakekatnya merupakan usaha menciptakan alat se-jalan dengan tujuan yang ingin dicapai. Dalam artian itu, dinamika psikologis yang terkandung didalam-

nya adalah orientasi pada maksud atau tujuan. Karena tidak seluruh perilaku manusia mempunyai tujuan pasti, kita dengan sengaja membatasi konteks perilaku; yaitu membatasi diri pada segi kognitif tujuannya.

Kaitan ini secara konseptual dipengaruhi oleh konsep budaya. Untuk keperluan analitis, budaya perlu dijabarkan dalam pelbagai pengertian kausal. Diantaranya yang penting adalah sebagai berikut: tradisi yang menjadi alasan untuk tindakan dan pilih-memilih strategi; persepsi moral yang mendefenisikan kekuatan dan tujuan dari tindakan; gaya dan keteraturan perilaku yang menjadi isinya, yang pada gilirannya mencakup semua komponen tersebut. Asal usul dari komponen-komponen ini tidak terbatas pada cara perilaku kognitif bertujuan saja, tetapi juga bisa berasal dari hal-hal lain termasuk didalamnya agama, estetika dan efektifitas.

Prinsip utama perilaku manusia dalam konteks penggunaan dan/atau penyalahgunaan sumber-sumber alam adalah pilihan rasional atas pelbagai tujuan dan strategi-strategi untuk mencapainya. Istilah "rasional" ini harus dibedakan dengan *common-sense*. Pilihan rasional lebih dijabarkan sebagai "perbandingan antara dua tujuan atau lebih untuk memilih salah satu diantaranya, dan untuk menghasilkan suatu kompromi tertentu". Manusia memperkuat pilihan rasionalnya dengan dimensi temporal yang dinamakan "antisipasi" yaitu pilihan diantara dua atau lebih tujuan sehingga

keputusan yang dilakukan sebagian berdasarkan perbedaan-perbedaan dari keuntungan-keuntungan atau kerugian-kerugian yang bisa diperoleh di masa mendatang. Rasionalitas pilihan dan keputusan yang dibuat dengan demikian bersifat nyata, dengan pengertian bahwa kemungkinan bagi terjadinya pertentangan dan perbedaan tuntutan tidak tertutup, dan sebab itu pilihan adalah kompromi *vektorial*.

Strategi pengambilan keputusan ini kemudian berkembang untuk selanjutnya menjadi strategi adaptasi terhadap lingkungannya. Gagasan strategi adaptasi ini memberi indikasi bahwa dengan berulang kali memilih aktifitas-aktifitas tertentu, individu-individu menyusun alternatif-alternatif yang kemudian mungkin dipilih atau ditiru oleh orang lain. Dengan demikian, maka adaptasi dapat didefenisikan sebagai kemampuan individu untuk menghadapi lingkungan, dan juga kemampuan kelompok atau masyarakat untuk tetap bertahan dan berubah. Secara lebih jelas Bennet mendefinisikan adaptasi sebagaimana dikutip Whitten & Whitten (1972):

" *pola-pola yang terbentuk oleh semua penyesuaian yang dibuat orang secara terpisah-pisah untuk memperoleh dan menggunakan sumber daya-sumber daya dan untuk mengatasi masalah-masalah mendesak yang mereka hadapi....*". Persoalannya apakah strategi-strategi penyesuaian ini direncanakan secara sadar atau tidak, dan persoalan mudah tidaknya strategi ini diterima.

Hal ini disebabkan karena karena penyerapan proses adaptif itu ke dalam perspektif normatif dari pemikiran dan perbuatan manusia tidaklah sama.

Pada tahun 80-an, "pendekatan prosesual" atau "transisi ekologi" atau "pendekatan problem" ini coba disempurnakan lagi oleh Vayda yang melihat bahwa sekarang sedang terjadi perubahan yang cepat dalam aneka warna migrasi manusia, sumber daya dan pengetahuan, yang melewati batas-batas ekosistem, sosial, dan geografi. Ini telah membuat Vayda lebih jelas melihat keterbatasan - keterbatasan pendekatan ekuilibrium dalam ekologi manusia dan makin keras mempertanyakan berbagai asumsi penciptaan unit-unit seperti kebudayaan, masyarakat, komunitas dan ekosistem sebagai unit analisis dalam ilmu ekologi dan ilmu sosial. Metode ini disebutnya *progressive contextualization* dan memfokuskan perhatian pada aktivitas manusia yang penting atau berbagai interaksi manusia dengan lingkungan dan kemudian menjelaskan interaksi ini dengan menempatkannya dalam konteks yang makin lama makin luas dan padat (Ahimsa-Putra, 1994, 40).

C. Kesimpulan

Secara umum dapat dikatakan bahwa pendekatan antropologi ekologi yang berkembang seka-rang lebih menekankan pada pendekatan etnoekologi dan ekologi sistemik serta pendekatan transisi eko-

logi atau ekologi prosesual. Kecenderungan pada dua pendekatan ini bukan berarti telah meninggalkan sepenuhnya pendekatan-pendekatan sebelumnya. Bahkan banyak ahli menunjukkkan bahwa perkembangan ke dua pendekatan di atas banyak dipengaruhi atau secara kritis dipengaruhi oleh pendekatan-pendekatan determinisme, posibilisme, dan ekologi budaya Julian Steward yang berkembang sebelumnya.
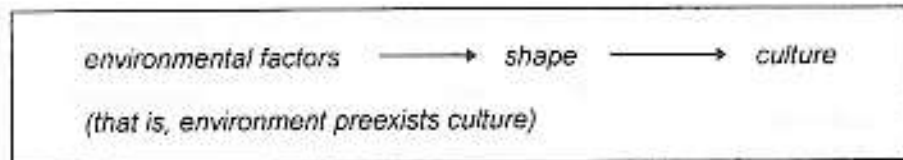
Pendekatan etnoekologi dan ekologi sistemik, banyak disejajarkan dengan strategi materialistik dan positivisme khususnya di Amerika Serikat yang mengikuti jejak ilmu pengetahuan alam dan teori sistem umum. Kelompok ini sangat gencar menyebarkan ide-ide mereka yang menganut "etnografi baru" atau "etnosains" (Conklin, 1957; Harris, 1968) dengan mengembangkan jenis kajian ekologi mereka sendiri (Fowler, 1977). Menurut Frake (1962) "seorang etnografer tidak mungkin puas dengan sekedar mendaftarkan komponen-komponen suatu ekosistem kebudayaan menurut kategori-kategori ilmu pengetahuan Barat. Ia juga harus mendeskripsikan lingkungan sebagaimana cara masyarakat itu sendiri menginterpretasikan, sesuai dengan etnosains mereka". Cara kerja ini, menurut Vayda dan McCay (1975), meletakkan dasar tidak hanya menyelidiki cara orang memandang lingkungan mereka, tetapi juga persepsi mereka bila menghadapi ancaman dan bahaya bagi lingkungan dan kelangsungan hidup mereka.

Pendekatan transisi ekologi atau ekologi prosesual, lahir dari kecaman-kecaman bahwa orientasi pendekatan ekologi sistem mengabaikan keaneka-ragaman dan kekuatan pengambilan keputusan manusia. Menurut Bennet (1969, 1973), penggunaan model-model ekologi sebagai pengganti model perilaku sosial tidaklah tepat, sebab manusia dapat mengendalikan ekosistemnya, dan pilihan serta manipulasi mereka banyak didasarkan pada berbagai kekuatan sosio-kultural yang kompleks yang belum dimanfaatkan atau dipantau dalam banyak kajian ekosistem. Bennet mengusulkan bahwa tekanan kajian diletakkan pada "strategi-strategi adaftif" yang terdiri dari pilihan-pilihan dan keputusan-keputusan individual. Asumsinya bahwa alam adalah bagian dari kebudayaan lewat adaptasi kebudayaan manusia. Masalah-masalah lingkungan yang mendesak akan nampak dan akhirnya harus diatasi lewat pilihan-pilihan dan keputusan-keputusan individual.

Bennett (1976) menggambarkan model-model pendekatan kajian hubungan antara manusia dan lingkungan, sebagaimana ditunjukkan pada skema-skema berikut ini.
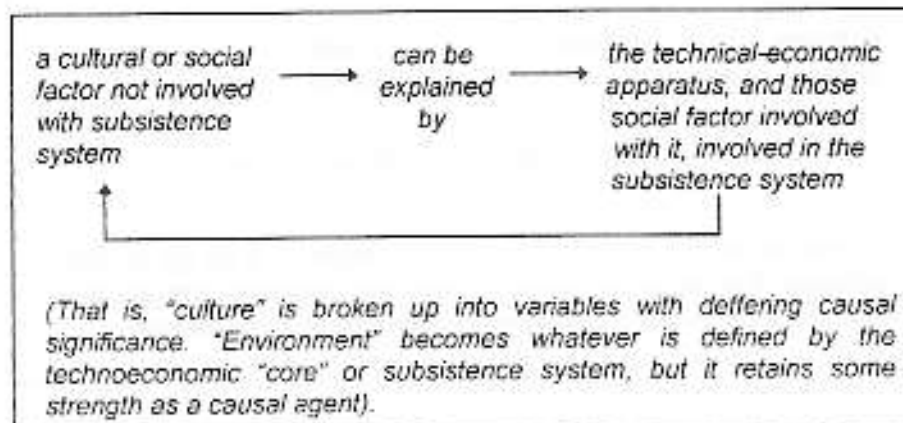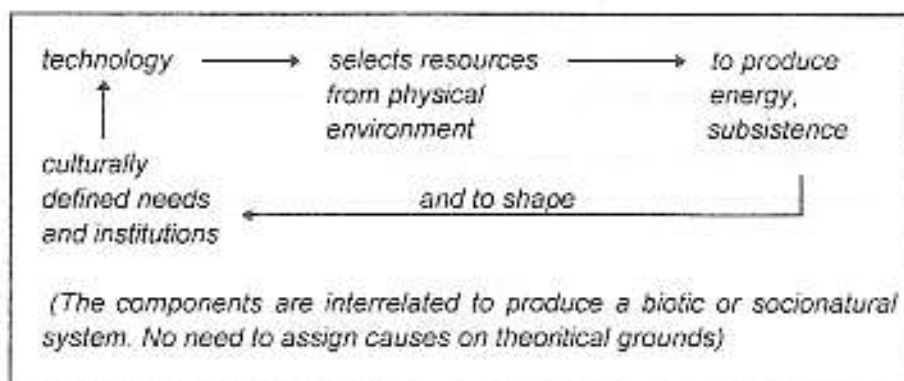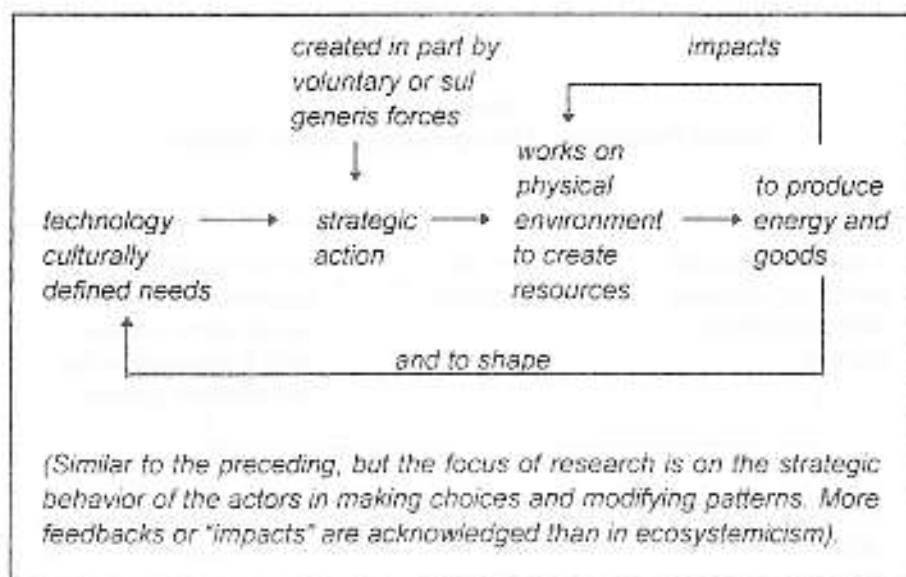
Skema 1
Model Pendekatan Determinisme.

environmental factors ⟶ shape ⟶ culture

(that is, environment preexists culture)

Skema 2
Model Pendekatan Posibilisme.

cultural selects from ⟶ to ⟶ create a subsistence style
environment and other cultural factors

(that is, "cultur" preexists the inquiry, "It" is the basis of behavior. Objectives largely descriptive. Environment entirely subject to culture. Choice or selection is the critical step here, ihough it is generalized as "culture")
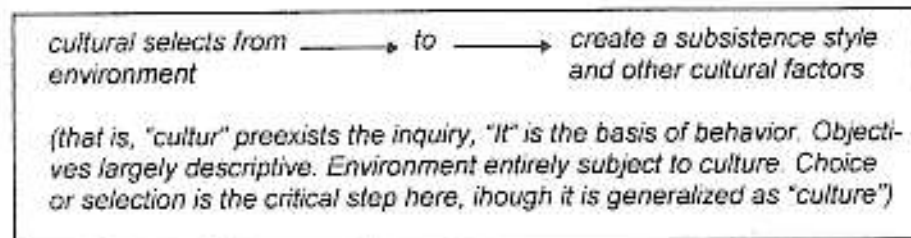
Skema 3
Model Pendekatan Ekologi Budaya Julian Steward.

a cultural or social can be the technical-economic
factor not involved explained apparatus, and those
with subsistence by social factor involved
system with it, involved in the
subsistence system

(That is, "culture" is broken up into variables with deffening causal significance. "Environment" becomes whatever is defined by the technoeconomic "core" or subsistence system, but it retains some strength as a causal agent).

Skema 4
Model pendekatan Ekologi Sistemik.

technology ⟶ selects resources ⟶ to produce
   ↑   from physical   energy,
              environment   subsistence

culturally
defined needs   ⟵   and to shape
and institutions

(The components are interrelated to produce a biotic or socionatural system. No need to assign causes on theoritical grounds)

Skema 5
Model pendekatan Transisi Ekologi.

      created in part by   impacts
      voluntary or sul
      generis forces

          ↓   works on
               physical   to produce
technology ⟶ strategic ⟶ environment ⟶ energy and
culturally   action   to create   goods
defined needs   resources

  ↑   and to shape

(Similar to the preceding, but the focus of research is on the strategic behavior of the actors in making choices and modifying patterns. More feedbacks or "impacts" are acknowledged than in ecosystemicism).

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ADAPTATION   § 9552

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The subject of this paper is adaptation. I shall frame my discussion in terms of three topics which have nagged anthropology since its beginning. These topics are: 1. the role of biogenetic factors in cultural behavior; 2. the relation between behavioral systems and the external or natural environment; 3. the relation between mind, behavior, and ecological adaptation. I hope to show that these three topics reduce to a single theme when they are considered in terms of the central problem, adaptation. In addition, I hope to show that two of the major lines of development within anthropology, ecology and structuralism, can be reconciled and combined in a unified approach to human adaptation.

DEFINITIONS

The term adaptation as it has been used in biology and anthropology has been reviewed by Alland & McCay (4) and Alland (2). Here I shall note two problems which emerge in both disciplines. The first problem derives from current meanings of adaptation within biology where the term is used in reference to either physiological or evolutionary processes. *Physiological adaptation* is an organismic or systemic response to parametric variation which acts to maintain homeostasis. *Evolutionary adaptation* is transgenerational change in the direction of increased maximization in specific environments. These definitions have been noted in cultural-ecological studies and have been adopted by anthropologists as analogies to organismic processes. Bateson (6) and Slobodkin (44) have applied the physiological model to the analysis of hierarchical responses in behavior systems which act to maintain systemic continuity over time in response to different degrees of pertubation. Each of these definitions has value for anthropological research, but when they are used interchangeably, as they sometimes are, confusion results.

The second problem derives from the tautology which emerges when adaptation as a transgenerational phenomenon is used to explain the existence of particular traits. To say that adaptive traits are those which are present in systems, or that those traits which are present in systems are adaptive, adds nothing to our understanding of process. To be meaningful, adaptation as a temporal process of transgenerational change must have some kind of inde-

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pendent measure and/or be charted according to a consistent theory. Alland (2) has suggested that for egalitarian societies this measure can be the same as that used in biology (comparative demographic success or increased ability to transform environmental energy into organisms), but the development of complex social systems (ranked or class societies) creates a whole set of new problems which can be met only partially by a consideration of demographic success. Harris (21), noting both the risk of tautology and the measurement problem, suggested sometime ago that parallel traits or sets of traits occurring under the same or similar technoenvironmental conditions in different geographical areas could be taken as strong evidence for adaptation in behavioral systems; Godelier (18, 19) and other Structural Marxists (Friedman 17) see adaptation as a process of accommodation to environments and to certain internal characteristics of the behavioral system itself. They do not limit the concept of adaptation to technoenvironmental success and do not adopt a quantifiable measure. Instead they document the process of adaptation through a careful processual analysis in which structural-Marxist principles are applied to ethnohistorical data.

A processual theory of adaptation must account for continuity and change of evolutionary systems rather than the specific characteristics of the systems themselves. It must begin with some understanding of the human potential for adaptation in the biological sense, uncover those mechanisms which maintain continuity or produce change, and generate transformational rules which can be used to explain and predict changes in behavioral systems with specific characteristics under stated sets of conditions. The focus on evolutionary stages or sets of accumulated traits, both of which have a long tradition within evolutionary anthropology, avoids the problem of process. This produces a static orientation in which stages become reified and serve as explanations for their own existence.

BIOGENETIC FACTORS IN CULTURAL BEHAVIOR

Recent developments in ethology have challenged the view, held since Boas, that biogenetic factors play no role in culture. It is to Boas that we credit the demonstration that groups with similar genetic patterns can have vastly different cultures and that similar cultures can be found among peoples with different genetic backgrounds. Such data destroyed scientific arguments for racial explanations of cultural differences. Yet even Boas accepted the idea, still current in all branches of anthropology, that the human species was a single biological entity and that the base line for all cultural developments was some sort of psychic unity. This concept must, of course, be grounded on the axiom that human brain patterns have something to do with behavior. Since Boas we have assumed that psychic unity can be used to explain similarities but not differences in cultural behavior. After all, how could a mechanism which is held in common

by all members of the species generate differences among separate groups of that species? Such an assumption is wrong, however, if we consider the role that any specific pattern must play in the development of cultural behavior in the context of different cultural, environmental, and historical factors. Brain structure, which is itself a developmental process (Piaget 38), must interact dialectically with environmental variables in very definite ways which ultimately yield differential cultural patterns.

In 1959 Spuhler published *The Evolution of Man's Capacity for Culture* (48). This book, which had a wide influence in both physical and cultural anthropology, presented a program for determining what biological factors in the evolution of primates had led to the specifically human capacities for culture and language. Physical anthropology in the 1950s and 1960s concentrated much of its effort on models which could be used to account for human capacities. These models were constructed on and checked against data from the fossil record and ethological studies of infrahuman primates.

The concept of capacities has become so popular that it is current practice for scholars to introduce their discussion of human behavior in terms of capacities and then pass on to other matters. Although the concept has been of great importance for the development of anthropology, employed this way it is reduced to a useless truism. In addition, while it opened up speculation about fossil evolution in behavioral terms, the capacities paradigm tended to structure the theory of emergent behavior on a series of analogies from infrahuman primates which have evolved their own sets of capacities in the context of their own environmental niches. Not enough thought was given to what might be called human ethology, the study of panhuman behavioral patterns.

Primate studies have tended to serve as metaphors for current thinking about human behavior and its origins. When in the recent past anthropology was dominated by a male centric view of behavior, hunting, aggression, and territoriality were seen as the main forces in the developmental process. With a change toward a more balanced view, which includes a consideration of hunting and gathering as well as the development of cooperation in the context of increasing sociality and complex cognitive structures, primate studies have become more sophisticated, yielding confirmation of new theories of human biological and social evolution.

Experiments in language learning among chimpanzees have demonstrated that these animals are capable of rather complex learning in the area of communication. While such studies tell us much about the capabilities of these apes, as well as the creative ability of scientists to teach "language" across the species barrier, they tell us little about the development of language in humans. Chimps do not learn the way humans do, nor is there any evidence that they have real genetic programs for speech function. As good as they are at learning various forms of sign language, they are incapable of lying to each other or of creating the kind of rich associations which produce metaphor and theory building. Discussion of chimpanzee speech tends to confuse communication, which is found

in various forms throughout the animal kingdom, with language, which is a specifically human adaptation.

The growing interest among the general public in ethology and primate studies has led to a long series of popular books (Ardrey 5, Lorenz 33, Morris 35, Tiger & Fox 49), which have misused and misinterpreted the available data from ethology as well as the new field of behavioral genetics. It is in this domain that weak analogies between the behavior of modern *Homo sapiens* and other animals have been used, often in distorted form. Much good material has suffered by citation out of scientific context. Such works have given ethology a bad reputation, particularly among cultural anthropologists. In a rush to protect the concept of culture from biodeterministic inroads, many anthropologists have rejected any notion that biology may be linked to contemporary behavior. Here they hide behind the concept of psychic unity, having only the vaguest notions of what such a concept might mean in biological terms. I believe that it is a professional duty of anthropologists to protest against the misuse of data, but this should not lead to the rejection of careful ethological work. My own book, *The Human Imperative* (1), was not written as an attack on ethology as a field. Rather, it was an answer to a number of books which can best be classed as "pop" biology.

It is my opinion that much of the speculation about the human biogram has been weak specifically because its models have been taken too much from studies of other species. We need to know more about the biological under-pinning of behavior in contemporary *Homo sapiens*. We need to recognize that our cerebral hardware may not only limit the outside boundaries of behavior, but may also directly influence the developing behavioral system.

One of the earliest excursions into the realm of biology and behavior was Darwin's *The Expression of Emotions in Man and Animals* (11). Although out of date in some respects (particularly methodology), Darwin's study stands as a model for the kind of cross-cultural research which must be done if we are to discover what behavioral patterns in our species can be closely linked to biologi-cal programming. Eibl-Eibesfeldt (13) has filmed and analyzed human ex-pressive patterns across the boundaries of culture and among individuals deaf and blind from birth. Several constant patterns emerge from these studies. They are related to emotional expression and certain social displays which may turn out to have a strong biological element in their development.

On another plane the theoretical implications of structuralism, particularly the work of Lévi-Strauss (26–32) and the linguistic theories of Chomsky (7), call for a reexamination of the assumption that culture is a completely open system. Lévi-Strauss' models of structural transformations, even if eventually they will have to be replaced with other models (Sperber 45), suggest that mental patterns are very much a closed system operating within a set of very strict rules. Chomsky suggests that underlying the variety of the world's languages are principles of universal grammar which are inborn and which limit and pattern the range of variation possible in the development of any natural language. Struc-

turalism recently has been approached from an overtly biological perspective by Laughlin & d'Aguili (25).

BEHAVIORAL SYSTEMS AND THE EXTERNAL ENVIRONMENT

In the early 1960s a group of anthropologists and archeologists took over adaptation models from biology and animal ecology. Treating human groups as populations, they consciously abjured the stages of development approach emphasized by earlier evolutionists. Instead they turned to an examination of the dynamic relationships between populations and the environment, including other human groups. The pioneer work is, of course, *Basin-Plateau Aboriginal Sociopolitical Groups* (Steward 46), which antedates these developments by a good 25 years. It should also be noted that this school was inspired in part by the work of Leslie White (53, 54), who kept the idea of evolution alive at the end of the Boas period and beyond. Although he followed a stages model, White also emphasized process, particularly the role of energy transformation in the evolution of social systems.

The new ecologists abandoned the notion of culture *sui generis* along with the superorganic, which were both strong elements in White's thinking, and turned instead to study at close range and in detail sets of relationships between human populations and their environments. They measured caloric input and output, trophic systems, nutritional and disease factors, soil types, flora and fauna, and subsistence techniques, in an attempt to see how specific populations fit as biological entities into their environmental settings.

The archeologists among them (Flannery 14–16, Coe & Flannery 8, McNeish 34) began to see the origins of domestication as a process of accommodation between plant, animal, and human communities, which developed not as revolutions but as slow adaptational movements towards greater degrees of resource management. The development of urban settlement was schematized as a combination of factors which included ecological and social variables. Freed of the stages concept, these anthropologists examined data from the perspective of specific hypotheses. Differences in process leading to the same result were uncovered through research and explained in terms of different ecological and historical conditions (Flannery 14–16). Deprived, in most cases, of data on social organization, these scholars dealt primarily with technological and settlement patterns. Privileged by long time runs in their data and new techniques, and aided by experts in botany and zoology, they developed sound answers to processual questions.

The ethnologists among these human ecologists were forced to limit the range of collected data. Their problem was the inverse of that faced by archeologists. They had rich material but short temporal depth. This type of data framework led to a limited but detailed examination of specific systems. Since the work of Vayda (50), Vayda & Leeds (52), Collins (9), and Collins & Vayda (10), these

scholars have tended to concentrate on self-regulatory systems. The landmark work of this type is *Pigs for the Ancestors* (Rappaport 39). In this work Rappaport attempted to demonstrate a self-regulating system of pig husbandry and ritual pig slaughter which maximized the adaptation of a series of interrelated populations in relation to the carrying capacity of their technoenvironmental setting. Unfortunately, none of Rappaport's data really demonstrate the existence of such a self-regulating system. As Rappaport himself reports, the Tsembaga population at the time of his study was well below carrying capacity. Although there was some indication that the group had been more numerous at a former time, ethnographic data could confirm neither the demographic hypothesis nor the hypothetical system of self-regulation as it was supposed to have functioned in the past. In addition, since the publication of *Pigs for the Ancestors* the whole concept of carrying capacity has come into question as a measurable quantity (Street 47). In the construction of ecological models, carrying capacity remains an interesting theoretical tool, but we now know that it is practically impossible to quantify.

Recently the group of anthropologists and biologists associated with Vayda have begun to examine ecological and cultural change as well as stability. Vayda himself has looked at the maladaptive aspect of Maori warfare which developed under acculturation conditions (51). In addition, this group has begun to look at short and long range change in systems as well as conditions which promote stability within the framework of response hierarchy originally developed by Gregory Bateson (6). In this model systemic change is examined as a set of possible responses to environmental change which are triggered by the degree and duration of perturbation. Such responses are ranked in a hierarchy which operates to maintain overall stability, particularly under widely fluctuating conditions that nonetheless oscillate around a mean value. Adaptation here is seen as the ability of a system to return to a previous state when conditions permit. Too rapid unidirectional change is seen as maladaptive because the return of environmental parameters to initial conditions would force a new adaptation rather than a more economical return to a previous state. Such reversible hierarchies of response in cultural systems are equivalent to physiological adaptation in organisms.

While these ideas represent a further refinement of earlier borrowing by anthropologists from biological models, I believe that a too facile transfer of such concepts to notions about stability and change in cultural systems can lead to a reintroduction of the superorganic into ecological discourse. Cultures are not superorganisms. Their boundaries are not as definite and fixed, nor are their systems so fully integrated as biological systems. Organisms have physiological and morphological memories built into their genomes. Their return to an initial state after stress is less problematical than a hypothetical return for cultures under stress. In addition, the idea of systemic integrity and stress plasticity also involves the idea that lags, which inhibit change under initial conditions of perturbation, are in some way not only adaptive but are outcomes of natural selection. It makes more sense to me to conceive of flexibility rather than lag as

the outcome of selection. Systems which have limited response ranges to changing environments will tend to be replaced by more flexible systems, at least in variable environments.

In spite of my caveats, I believe that the ecological approach to adaptation has been valuable. It should be clear that the major shift in evolutionary thinking which has developed in human ecology has been the turn away from stages of development to a more dynamic view of process fully parallel with evolutionary thinking in biology. Such a framework allows the anthropologist to generalize from specific cases of human behavior to general processes of biological adaptation and to phrase these generalizations in terms of thermodynamic and information theory. These theoretical orientations in their turn allow the researcher to seek out new data on human behavior and to organize it in new ways.

Rappaport (40) has suggested that ritual is an information exchange device which communicates cultural, ecological, and demographic data across the boundaries of local social groups. Such information can then be used in the planning of short range ecological and social strategies. The interaction of a series of groups in a bounded environment may be more adaptive for a complex population system of interacting parts when gain and even loss for some groups may be regulated by the flow of such information. Rappaport suggests that information transferred during rituals, and which is therefore sacred, is likely to be accepted as true even by conflicting parties. If this is the case, strategies would be based on the evaluation of such "true" information by the participating groups.

These ideas are interesting and theoretically valuable, but they are difficult to operationalize without long time runs and careful measurement of a wide range of variables. This is perhaps why ecologically oriented archeologists have presented more convincing arguments than have cultural ecologists. The goals of the archeologists are more modest, they have greater control of the temporal element, and they treat populations which, by virtue of their extinction, are no longer subject to new historical forces.

A close look at cultural ecology yields other difficulties. In general, cultural ecologists do not consider cause; instead their program is to explain function. They deal with what "is" rather than with some ideal adaptive system. It is for this reason that they reject questions about hypothetically better adapted systems. In the case of pig husbandry among the Tsembaga, for example, a nonecologist might ask why the people allow pig herds to get too large and only then reduce the population through overkilling (a process which reduces the available supply of meat well below amino acid requirements). Why don't the Tsembaga keep their herds at a constant more rational level, have a steady supply of high-grade protein, and avoid degradation of the environment as well as the other inconveniences associated with overly large herd size? Such questions are not entertained by the Vayda school of cultural ecology because, it claims, the system as such has been described and explained. These analyses are distinguished from earlier functional analyses on the basis of a model of self-regulation which allows the observer to predict responses to systemic and

environmental variation. Such explanations, however, depend for their force upon clearly defined and demonstrated feedback systems whose variables do indeed change values according to predicted directions at predicted times. While many such systems have been "sketched" (to borrow Rappaport's own term) none have been successfully demonstrated. When such systems are not demonstrated, there is the high risk that the notion of adaptation will fall back into tautology. Under these circumstances the nonecologist's questions about hypothetically better or more rational systems are in fact justified.

Sahlins (41) has raised serious objections to the ecological framework. He has done this by readily admitting that what's there is there, but adding that if no system is demonstrated, we are reduced to the truism that all populations that exist are in some sense adapted. His criticism has been countered (Harris, personal communication) by the suggestion that populations exist below carrying capacity because adaptive systems must hedge against the poorest possible conditions. Thus population will adjust to the carrying capacity of the environment in its poorest yielding years. This could be a valid argument, but it is unproved. Considering the problem of carrying capacity in general, this solution to Sahlin's objections is like putting a bandaid on gangrene.

In the place of ecological explanations, Sahlins has offered his own ideas concerning production in technologically primitive societies. He sees the mode of production, particularly what Marxists call the relations of production, as a cultural rather than an ecological category. The amount produced by a population will depend, not on the carrying capacity or some other environmental adjustment, but rather on the kind of social unit that is engaged in work, the nature of distribution, and the nature of economic control within the society. Sahlins notes that so-called primitives tend to underproduce. Such an observation leads him to question why any society might produce more than is necessary to meet immediate needs. Surplus production is seen as a social glue used to unite segments of society which otherwise might fragment. The posited underproduction is seen as a natural response to need against the absence of any incentive to work any harder than is necessary. Sahlins calls the mode of production in simple societies the domestic mode of production or DMP.

Although the DMP as an explanation for underproduction is far from proved by the data Sahlins presents, his substitution of cultural for ecological explanations of basic economic patterns must be dealt with. As I shall suggest below, the correct solution to this problem might lie in a combination of cultural and ecological factors which operate together in the development of specific adaptations.

Not all cultural ecologists have concerned themselves with functional systems. A different, and to my mind less successful, approach to adaptation has been taken by Harris in a series of publications beginning with "The Cultural Ecology of India's Sacred Cattle" (23). Harris suggests that cultural traits which have persisted through time in particular settings are adaptive. This is certainly reasonable, and as a working hypothesis should be substituted for the ethnocentric idea that traits which don't "make sense" in terms of the researcher's

culture are malfunctional. For too long some anthropologists and many laymen, particularly those involved in planned change, have been overly willing to assume that major aspects of indigenous behavior are somehow maladaptive if not queer. Harris has examined the taboo on cows in India, and more recently, the taboo on pork among Jews. The former is a taboo for *use* (the cow, it is suggested, is too valuable to eat in most cases). The latter is a taboo for *nonuse* (cattle function in Indian society as a major source of traction, fuel, and fertilizer). In addition, their meat is channeled to outcastes, a poor segment of the population. The pig is seen as an uneconomical if not dangerous animal to raise under the fragile ecological conditions prevailing in the Middle East.

Taboo for use is an old idea in anthropology and has long been employed to explain such customs as first-fruit ceremonies which have been assumed to operate as conservation devices. Such ceremonies are thought to prevent premature harvests, therefore allowing maximum growth of crops.

While it is useful to employ explanations of this type, they are limited by all the restrictions noted for classical functional analysis (Hempel 24, Nagel 36). They provide good arguments for neither cause nor necessity. In addition, even if such behaviors are adaptive, there is no evidence that they have been selected in the Darwinian sense, nor can they be analyzed as part of a larger and perhaps coherent cultural system.

Taboos for nonuse are even more difficult to justify ecologically. Simplicity demands the hypothesis that experience within a particular environment will lead to conscious or unconscious adaptive choices that do not require taboo. The only requirement is that there be a stated (or even unstated) rule in the culture that a resource not be used. To require a taboo on an animal which is ecologically destructive is cultural overkill. Why use pigs if they are not useful in a stated context? After all, the message which Harris wishes to convey is that natives and native cultures are not stupid. To justify his argument for taboo, Harris falls back on an idealistic principle that runs counter to his technoenvironmentalism and anti-idealism. He tells us that pig meat is inherently delicious; that people want to eat it. It is for this reason that it must be taboo. "The Middle East is the wrong place to raise pigs, but pork remains a succulent treat. People always find it difficult to resist such temptations on their own," (Harris 22, p.44). A strong desire is frustrated by a religious sanction. But what makes pig meat more delicious than beef, or horse for that matter?

In addition, and more to the point, cows in India and pigs for Jews are part of coherent systems of taboos and religious beliefs. Jews forbid not only pigs, but a host of other animals as well as parts of animals. It is likely that such beliefs are not autonomous, but they must be explained systematically and together, as Mary Douglas (12) has attempted to do.

Harris' analysis does, it must be noted, demonstrate an important fact. It shows us how valuable the cow is in present-day India. This aspect of Harris' argument has been confirmed by Odend'hal (37). Such material has great value for students of culture change and acculturation as well as those involved in practical programs aimed at improving local economic conditions.

One might tend to think that the taboo for *use* argument is stronger than the taboo for *nonuse* argument. But if one examines the situation historically, it will be seen that cow love is an ancient trait, linked to other ancient traits which developed under ecological and demographic conditions vastly different from those found in the present day. Cow love entered Indian culture when the Indian ecology was richer and less degraded than it is today. It might also be noted that while elephants are also sacred animals in India, there is no stated taboo on their flesh. Yet they are not eaten and they are, like cows, highly useful as working animals. Their status in the culture as a source of heavy traction undoubtedly contributes to their place in religion, but it does not explain their part in the total system any more than Harris' explanation of the cow taboo explains the latter animal's place in the same system.

Harris' *"etic"* explanations, which come from the imposition of an outside grid upon collected field data, tell us much about the adaptive nature of specific traits in terms of what our own science has taught us, but they tell us nothing about the culture in question *as a culture*. The method can be used to answer certain questions which fall into the realm of natural history, particularly whether or not a particular trait is adaptive, but it cannot provide us with a processual theory of human adaptation.

Harris' model sees the human being within culture as an "economic man" who makes rational choices. For Harris and other ecologists it is not necessary that these choices be conscious. Rather, it is assumed that as a culture experiences its environment, the behavioral system will be shaped by that experience. This model, which I have also used (1, 2), is borrowed from behavioral psychology. The behavior of individual organisms can be shaped in the laboratory by rewarding random actions which approach a desired norm. For the theory of culture under discussion, one need only substitute nature or the environment for the experimenter and culture for the individual. Behaviors which conform to an adaptive fit in terms of the environmental niche will be rewarded and those which are maladaptive will eventually be extinguished. Under such conditions "rational" behavior need not develop consciously, although conscious process may enter into the development of some adaptive behavior. This theory has the advantage of eliminating consciousness as *necessary* for cultural change.

Human behavior, however, is not this simple. While it is perhaps good strategy to assume with the cultural ecologists that a trait is adaptive, such a working hypothesis might prove false. Human behavior is, in fact, often maladaptive, at least in the sense that not all behavior, even behavior of long duration and time depth, represents a simple adaptation to environmental conditions. Humans are the only species in which too much thinking may lead to false solutions. This is because human thought has its own patterns which involve a highly developed ability to connect (and disconnect) concepts as well as stimuli in what might be called metaphorical patterns. Such patterns may lead to great insight or creative operations, but they may also lead to construction of a "reality" far removed from the best adaptive patterns. In addition, the demon-

stration of adaptiveness, when it can be made, is limited by all the restrictions mentioned above. Its power of explanation should not be exaggerated or we shall run the risk of substituting just-so stories for scientific explanations.

MIND, BEHAVIOR, AND ADAPTATION: STRUCTURAL ECOLOGY

A structural ecology must start from the double premise that human behavioral systems are the outcome of an adaptational process similar in most respects to the adaptational process that occurs in other species, but with the restriction that human brain hardware shapes response patterns according to internal structural rules. Human cognition and human behavioral systems as structures respond to their own rules and develop in the context of internal consistency.

The immunochemist, Morris Goodman (20), has noted that organic systems face in two directions. They are both internally and externally adapted. Internal adaptation (which favors homogeneity) represents the coherence and parsimony of the system as a system. External adaptation (which favors variation) represents the goodness of fit between the system and its environment. In the case of human behavior a specific kind of interaction must take place between brain hardware on the one hand and the perception and organization of environmental information on the other. This is internal adaptation. Just as somatic traits are selected by environmental pressures, behavioral traits will ultimately be shaped by environmental selection, but only certain privileged traits will have a high probability of emission by members of any particular culture. Emission will be controlled initially by "primitive" cognitive structures (genetic in origin) and later by a brain-based set of culturally realized cognitive structures. Because of its particular properties, any behavioral system *qua* system should restrain the range of traits generated from within that system. The human brain, however, is a powerful tool. Combined with the invention of writing and a developing orientation toward empirical knowledge, a new kind of self-correction can be built into behavior. This creates the distinction that Lévi-Strauss has made between *pensée sauvage* and scientific thought.

Selection can be seen to operate on three levels. The first selection will occur by virtue of the system itself. Emitted traits are limited by the characteristics of the system, by its genetic and cultural elements. The second selection will occur as emitted traits are accepted or rejected on the basis of systemic properties and will depend on how well a trait fits a particular structure. The third selection will occur as a result of interaction between the system, including newly accepted traits, and the environment. Any set of adaptational changes should be expected to pass through all three selective filters.

The kind of change I am talking about here, however, involves behaviors, or aspects of cognitive culture, which are tied to, or are part of, systems. From time to time behaviors may be emitted which are not tied to conscious ethnotheory or some unconscious systematic aspect of culture. (They will, of course, be restricted by the first filter, mental structure.) These are traits which are marked by

what I have referred to elsewhere as "grandfather" responses (3). In my own field work I noted that many aspects of behavior that Westerners would consider adaptive could not be explained by members of the native culture themselves except as parts of traditional behavior: "that's the way our grandfathers did it." These behaviors stood apart from ethnotheory. By using my own knowledge of public health, I was able to show that some of these traits had adaptive value in real medical terms. I should like to suggest that behaviors of this type can be fixed in culture through a simple process of conditioning in which the environment rewards good moves and punishes bad moves. Such traits should be rare, however, given the mental constraints posited above. The frequency of such traits in comparison with aspects of behavior which follow structural rules is an empirical question and should be open to investigation. In addition, it must be noted that not all "grandfather" traits should be expected to fit the adaptive model presented here. I suspect that some traits will be of the autonomous type noted, while others will be tied to segments of the cultural grammar which are organized on the unconscious level and will therefore not be amenable to indigenous explanations. Again this problem should be open to empirical investigation.

Although my own work in the past has been associated with the conditioning model, I now believe that the major difficulty in attempting to apply behavioristic theory to human behavior arises from the fact that only a small segment of culture can be explained in this way. If this is correct, then some effort must be made to combine the study of behavioral adaptation as human ecology (external adaptation) with the investigation of mental structures (internal adaptation) and their manifestation in actual behavioral systems. One of my students, Carol Laderman, hopes to study the hot-cold syndrome in the classification of foods in Southeast Asia. These systems of classification, which appear to be coherent within any one culture but highly variable from culture to culture, present ideal material for structural-ecological research. As systems they should reflect both structure and transformation when they are examined in different settings. As the basis of behavior they should form a code system which has ramifications for ecological adaptation in economic and nutritional terms.

Recently both physical and cultural anthropologists have begun to reexamine and downgrade the role of hunting in the evolution of our species. A new emphasis has emerged on gathering and the division of labor between men and women. Already much ink has been spilled on hypothetical reasons for fixed tasks on the basis of sex. At the same time the continuing interest in the incest taboo has refocused on its role in the stimulation of exchange between groups. It seems to me that these topics are ideal starting points for a discussion of the emergence of culture as structure and as adaptation. Exchange of women in marriage creates an exchange *between* groups, while the division of labor between the sexes creates exchange *within* groups. Both patterns are eminently cultural phenomena and are dependent upon the symbolic process. What is important in the case of marriage is not how many individuals of the proper type are exchanged, but what the system is. What is important about the division of

labor is not what men do and what women do, but rather that they do different things. It seems to me that any regularity in the actual tasks performed will depend upon socioeconomic and biological factors, while the division of labor itself should be reserved for structural considerations.

The development of a structural ecology will require the merging of the rationalist and empiricist paradigms discussed by Scholte (42, 43). The exclusive use of radical empiricism in anthropology has already shown its weaknesses for the analysis and prediction of behavioral systems. Its concentration on directly observed behavior at the expense of structural models has led to a theoretical impass in the field of social structure. On the other hand, the unwillingness of most structuralists to consider interactions between human population (as populations) and their environments has left us with a series of puzzles about the reason for differences in structures and the nature of their transformations. If external events are not plugged into our structural studies [as Godelier (18, 19) and Friedman (17) have suggested], we shall never come to understand the dynamics of process. Evolutionism and structuralism have both, in their own ways, tended to stymie real processual analysis; evolution because it has tended to reify stages rather than investigate transformations, and structuralism because it has tended to reify transformations and limit them to closed systems rather than investigate the role environmental selection must play in their development. Lévi-Strauss has shown us how systems transform in space, but his antihistoricism has tended to block the investigation of temporal change. His attitude toward change (partially esthetic and partially scientific), which only considers the ultimate stability of structures even as they transform, has led him to ignore the evolutionary and adaptational aspects of structuralism which emerge when we begin to look for internal and external constraints and stimuli which operate on the "pure" system.

In defense of Lévi-Strauss, we must remember that in order to disengage structures it was first necessary to take a strictly sychronic view of the phenomena under consideration. Lévi-Strauss has made it clear that the initial disengagement of structure demands a sychronic approach, in which one must rid the system of what we might call "historical noise." Lévi-Strauss has stated on several occasions that infrastructure is as real as superstructure. His research strategy was to emphasize the investigation of superstructure. Now that we know more about structures, it is time to integrate this knowledge into a more general theory of structural ecology.

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HUMAN ADAPTATION TO ARCTIC ZONES

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INTRODUCTION

The study of human adaptation to polar areas has engaged scholars in many fields since the late nineteenth century. The first two scientific monographs on the Eskimo were published in 1888 (16,55), and were soon followed by useful reports (2, 39, 99, 110). Since then much work has been undertaken, and efforts at a synthesis are now under way. Tundra ecosystems were recently a focus of research efforts by the International Biological Program (IBP), and students with interest in the human ecology of this region now have a rich and rapidly growing literature. The Swedish component of the IBP/Tundra Biome has published a useful collection of papers on the structure and function of tundra ecosystems (102).

Hildes (53) and Laughlin (75) summarized knowledge of arctic human ecology, and the synthesis volume from the human adaptability component of the US/IBP (66) updates and fills in many of the gaps identified earlier by Hildes (53) and Laughlin (75). The annotated bibliography by Culver (30) is outdated but still useful. Important discussions on the methodology of studying human adaptability to cold stress are presented by Yoshimura & Weiner (119) and Weiner & Louri (117). Important surveys of human adaptation to cold are those by Folk (42), Carlson & Hsieh (29), Edholm & Lewis (38), Van Wie (113), and Little & Hochner (81). The latter approaches the problem of thermal stress with an emphasis on growth and development. The best recent syntheses of tundra ecology are by Bliss et al (15) and Brown et al (17a).

In this review I shall concentrate on human social and cultural adaptive strategies as they are applied to High Arctic populations. At appropriate places the reader will be referred to relevant biological adaptations treated

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by Joseph So in last year's volume of the *Annual Review of Anthropology* (106a). All too often anthropological discussions remain isolated from each other, and a holistic view of human adaptation is thereby impeded. This review focuses not on a set of social/cultural mechanisms, but rather on the fundamental problems faced by populations in the Arctic and their adjustments to them. The basis of such human adaptability and the various multiple-level responses to these constraints are discussed in a recent volume by this author (87).

Social and cultural anthropologists have attempted syntheses since research began (e.g. 3, 16, 110). Among the more notable recent efforts are those by Birket-Smith (13), Spencer (107), Osburn (95), Gubser (46), Graburn & Strong (45), and Chance (28). Nelson (93) provided a finely detailed description of hunting behavior, as did Balikci (5). Damas (32, 33) undertook a comparative study of central Eskimo society using a cultural ecological approach. Lantis (73) has produced the most detailed descriptions of Eskimo religion and ceremonial life. These studies may now be integrated to human bioecological considerations through the efforts of the human adaptability section of the IBP.

The US/IBP research available to date on the High Arctic also suggests directions along which comparative studies can be made with other arctic regions. The contrast with regions such as the Aleutian Islands is striking and suggests that we have only begun to understand the numerous factors that are involved in arctic human adaptations (52, 74, 78). These contrasts in resources and exploitative means will be brought to the reader's attention throughout this review. Discussion of the antarctic region has been omitted because the inhabitants there are temperate zone dwellers transported to Antarctica for short periods of time, after which they return to warmer climates. Research on the adaptability of these temporary human inhabitants has been reported by Budd (19) and Natani & Shurley (92).

There is solid evidence that human occupation of arctic zones began between 8,000 and 15,000 B.P., when hunters from Siberia crossed the Bering land bridge (7, 56). However, there is indirect evidence that migrations may have occurred as early as 28,000 B.P. (61, 89). Laughlin (79) suggests that present-day Eskimos and Aleuts are both derived from a common sea-oriented Mongoloid population. According to Laughlin (79), those reaching Nikolski Bay became Aleuts, while those who migrated farther north became Eskimos. McGhee (86) discusses the occupation of Arctic North America. Fitzhugh (4) has given us an unusually useful work on comparative prehistory across the Arctic.

The High Arctic's extreme and prolonged cold makes plants so low in productivity that human populations have had to rely primarily on the consumption of animals that do not live year-round in the arctic tundra. In

addition to the cold stress to which populations are potentially exposed, the Arctic constrains human occupation because of seasonal extremes of light and darkness, snow cover for two-thirds of the year, and low biological productivity. Human adaptation to arctic zones requires a measure of psychological accommodation, physiological acclimatization, developmental adaptation, and cultural adaptation. The situation is even harsher in Antarctica. The Antarctic continent covers 14.24 million square kilometers, of which only 10,350 km² is estimated to be suitable for sustaining life. The largest permanent inhabitant is a tiny fly. There are no land vertebrates, no birds, no amphibians, no reptiles, no freshwater fish, no mollusks, and no earthworms. Only lichens, mosses, and fungi in protected coastal areas are able to exist (92, pp. 90–91).

Like other biomes, the tundra is not wholly undifferentiated. From the margins of the boreal coniferous forest, or *taiga,* to the polar desert, one may note at least three types of tundra vegetation. The "bush tundra" represents the ecotone that borders the taiga and is characterized by dwarf trees. The bush tundra grades off into the broader expanse of "grass tundra," composed of a nearly continuous mat of mosses, lichens, and bushes that tend to lie flat on the ground. When the soil surface thaws out in summer, the water does not drain but is soaked by the spongy vegetation. Closer to the poles is the "desert tundra," an area characterized by lack of vegetation, except in protected hollows (64, p. 362). These differences are associated with the depth at which permafrost begins. The depth of thawing may vary from only a few inches to a depth of about 2 feet. Below this the ground will remain frozen and impermeable to both water and plant roots (112). Tundra soils may contain high accumulations of peaty organic matter caused by the slow breakdown of plant material. The volume by Tedrow (111) is a definitive reference on arctic soils.

In all, tundra occupies about 8 million square kilometers of land or one-twentieth of the earth's land surface (116). To date, it is an area with a sparse population—i.e. between 2 and 18 persons per 100 km². In 1972 there were 95,000 Eskimos scattered in Greenland, Canada, Alaska, and Siberia (120).[1] In addition, several Eurasian peoples inhabit the Arctic, of which the Lapps, Samoyeds, Yakuty, and Chukchi are the most numerous (60, p. 23). The most comprehensive studies of Eskimo groups are those by Spencer (107) and Oswalt (96), both of which emphasize that cultural distinctions in Eskimo life-styles are the result of ecological adjustments to

[1]Eskimo populations are difficult to divide into unambiguous subgroups because of contradictory linguistic, cultural, and biological evidence. Zegura (120) discusses the various boundaries offered by these three perspectives. Krauss (70) summarizes the linguistic evidence, Spencer (107) the cultural basis, and Laughlin (79) the recent archaeological evidence.

coastal or inland resources. Spencer (107) divided the Eskimo populations into *nunamiut* (people of the land) and *taremiut* (people of the sea) in accordance with the predominant subsistence strategy.[2] Other ethnographers have noted that both groups tended toward endogamy (26) as a result of the specialization required to exploit the inland or the maritime resources (22, p. 24). The inland adaptation, based on caribou hunting, ended for a brief period in the 1920s and more definitively in the 1950s. In the 1920s, the outmigration was caused by shifts in caribou migratory routes, while in the 1950s, new weapons and overhunting reduced the size of the herd to the point where the human population could no longer be sustained (46; 104, p. 183; 107, p. 28). Since then, inland Eskimos have joined the maritime Eskimos in increasingly larger and fewer coastal villages (4, 65).

Tundra ecosystems are heat-limited ecosystems (15, 17a). As a result, there is low species diversity, low productivity,[3] and relatively insignificant plant succession. The short growing season in the Arctic inhibits levels of production capable of supporting a large herbivorous population. Tundra and desert ecosystems share comparably low primary productivity (54, 84). The crucial difference between them is that one is limited by water availability and the other by extreme cold.

Plants have numerous physiological adaptations to cope with arctic conditions: prolonged seed dormancy and rapid germination, vegetative reproduction, and metabolic systems able to capture, store, and use energy in a short time (11, p. 417). A large proportion of the plant biomass is below ground, protected from arctic wind, cold, and herbivore pressure (116, p. 457). The environment has been described as fragile because of these same characteristics. Alterations in plant cover reduce both surface insulation and albedo; more heat is absorbed, leading to deeper thaw and greater erosion. Erosion is difficult to control because of the slowness of plant succession. Once an eroded niche becomes emptied, there are few species that can occupy it because of the low species diversity (15, pp. 360–61). Arctic soils are of recent origin and tend to be hydromorphic. Most of the soil nutrients are not available for plants because of permafrost. To survive, therefore, plants use complex internal cycles that retain and reincorporate nutrients rather than relinquish them to the decomposers (20, p. 117). Phosphorus appears to be a limiting factor to arctic plants' productivity (20).

Many of the land animals such as reindeer (in Eurasia) and caribou (in North America) migrate over vast expanses of tundra territory in summer

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[2]Oswalt (96) has referred to these two groups as "tribes," but few have followed this suggestion.

[3]Mosses yield the highest proportion of total phytomass, followed by phanerogams and lichens (84).

and exploit the richer boreal forests to the south [i.e. the taiga (41)]. Caribou and reindeer are essential resources to the inland arctic populations, as documented by Gubser (46), Balikci (5), and Arima (4). Herding, specifically reindeer herding, is about the only other effective way of supporting human populations in the inland tundra areas [(67, p. 219); see also recent studies of reindeer herding and its modernization by Pelto (97), Ingold (57, 58), and Müller-Wille (90)]. Smaller fauna are found in greater densities. Insects are restricted to a few genera but are abundant in midsummer. Black flies, deer flies, and mosquitoes are so numerous that Eskimos in many areas must continue to cover most parts of their bodies, despite the pleasant temperatures, to avoid their bites.

Arctic birds have a fast life cycle, similar to that for rodents. The ptarmigan and the redpoll have heavy layers of fat and dense feathers for cold protection. Most bird and insect species, however, leave the tundra for more southern regions as winter approaches. More important to the arctic human population has always been the ocean fauna. Ringed seals (*Phoca foerida*), barbed seals (*Erignathus barbatus*), walruses (*Odobenus*), whales (especially bowhead, white, and fin types), and fish and shellfish varieties are among the most important maritime resources exploited. Seals provide many raw materials that make Eskimo cold adaptation possible, such as mittens, boots, summer coats, trousers, and sinew thread. Coastal Eskimos rely for up to 83% of subsistence on marine and freshwater aquatic resources rather than terrestrial production. The inland population relies on a more even seasonal exploitation of both aquatic and terrestrial animals.

ADAPTATION TO COLD STRESS

Temperatures, particularly summer temperatures, are commonly mentioned as the defining characteristic of tundra biomes. The most commonly used is Köppen's boundary line of the 50°F (10°C) isotherm for the warmest month of the year (51, 64). However, other factors besides actual temperature are involved in tundra climate. Throughout the Arctic, tundra areas can be found which lie south of the 50° isotherm (82). For example, wind is important in the Arctic, not because it is strong, but because the absence of trees reduces the drag force at the earth's surface and the velocity profile near the ground can be very steep (82). The wind chill factor and consequent danger of frostbite and dehydration can be severe and constitutes one of the critical problems for human populations (24, 27, 37, 38, 59, 81, 113).

Eskimo adaptations to cold stress are both physiological and cultural. One common misconception has been that Eskimos have a great deal of body fat, when in reality Eskimos are relatively lean (75). Other common

morphological characteristics offer inadequate protection (31, 106a, 108, 109). Laughlin notes that the frequent use of—and need for—slit goggles and visors during travel is evidence for the inadequacy of morphological adaptations (75). Failure to protect against cold stress can result in cold injury, frostbite, hypothermia,[4], and eventually death (24, p. 16). Among the cultural practices that facilitate Eskimo adaptation to cold are clothes, shelter, use of seal oil lamps, sharing of body heat, and diet. Recent writings have described the exposure of Eskimos to the arctic cold as chronic and moderate. In fact, the microclimate of men in arctic clothing is the same as that of men working in temperate zones in light clothing. Exposure to cold then occurs primarily in the more exposed areas of the face and the extremities (42, p. 101).

One of the important ways to prevent cold stress is by providing for adequate insulation. The problem is dual: how to provide for continued warmth and, while dissipating heat, how to prevent overheating during periods of strenuous work. If the latter problem is not properly solved, sweat-soaked or frozen insulated clothing would result in a loss of its cold protection effectiveness. That this sometimes occurs has been noted by Irving (60). He describes how Eskimos hang their clothes to freeze and then beat out the frost with a stick. Eventually they must scrape the leather to restore its pliability.

Two methods are commonly used to regulate heat buildup. In summer, when Eskimos must do heavy work they take off their impermeable "outside" parka and remain relatively cool from the outside temperature.[5] More important, however, is the actual design of the Eskimo clothing. The traditional clothing of the Arctic has many vented openings through which air can flow constantly in and out by the releasing or closing of drawstrings (42, p. 123). This is one way in which traditional Eskimos adapted clothing to ambient conditions. The other major factor is that clothing has always been characterized by numerous layers in which trapped air acts as an insulator and, with the outside layer being windproof and impermeable, holds the heat in and cold and wetness out (39).

Boots (*kimik*) call for special attention. The sharp ice at subzero temperatures can cut the best footgear, and extreme care must be taken to protect such clothing. The soles are made of carefully prepared bearded seal skin. They are sewn with sinew, but the sewer avoids making needle holes all the

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[4]Failure of the thermoregulatory system occurs when body core temperature is near 33°C, and death occurs at 25°C (27, p. 16).

[5]Another author noted that because of the difficulty of matching activity and weather to clothing while on the move, it is common to tolerate moderate degrees of thermal discomfort (17). The solution is to dress too warm and to tolerate sweating during work and shivering during rest periods.

way through the skin layers to assure its waterproofness. Stockings are made from the fragile fur of the arctic hare and are kept dry by inserting a pad of dry grass between the sole of the boot and the sole of the stocking. This pad absorbs any moisture that penetrates from outside or moisture from foot perspiration (39). Similarly, seakskin mittens have been filled with grass pads to protect the hands on long trips.

Because no clothing is perfect in design, Eskimos must rely on some behavioral adaptations to protect them from cold injury. The most difficult area to protect in travel is the exposed surface of the face. Warm hands are applied to the face when a sharp stinging sensation is felt. Hunting partners will warm each other's faces in this manner. Wiping mucus from the nose over areas manifesting signs of incipient frostbite has been noted (93, pp. 106–10).

Like clothing, Eskimo shelters must hold heat in and be waterproof. While engaged in nomadic activities in the pursuit of subsistence, Eskimos build snow shelters. Snow shelters (i.e. igloos) have been described as excellent insulators because of the myriad small air cells in the ice. The essential seal oil lamp provides the interior light and heat. The lamp causes minor melting of the inside snow surfaces which refreeze during the night, thus forming a smooth reflecting surface that conserves radiant heat. The outside surface becomes encrusted with snow and forms an airtight seal. In summer *tupik* or sealskin tents are utilized. The tents, made of dark-colored skins to absorb solar energy, are double layered and provide a comfortable temperature in the warmer periods (39). The tupik is made of many sealskins sewn into a continuous cover, with large tents requiring well over 60 skins. An inner tent and an outer tent create an area of dead air which facilitates warming during cold periods but can be opened during the summer months (39). For more permanent habitation, High Arctic Eskimos also build semisubterranean stone or driftwood housing covered with turf and snow for insulation. These are frequently located in protected hillside spots. Like clothing, the stone igloo always has ventilation holes to allow circulation and prevent overheating. The interiors are also covered with sealskins. Thus constructed, the subterranean home of winter is warm, keeping temperatures between 15.5° and 21°C (39).

While clothing and shelter help regulate exposure to cold and provide warm microclimates for humans, the Eskimos are exposed to extreme cold during winter seal hunting and ice fishing (72). In order to maintain body core temperatures within a permissible range, a number of systems may be activated. Of these the most important are regulatory shivering, vasoconstriction, increased basal metabolic rates (BMR), and increased oxygen consumption [see (106a) for a detailed discussion of physiological and biochemical adjustments (see also 71)]. The evidence on physiological ad-

justments does not suggest a general adaptation to cold by Eskimos and other arctic natives. This may be due to the excellent protection provided to the body by the cultural adjustments that prevent exposure of the body core (38, 42, 48–50, 81).

COPING WITH SNOW AND SEA ICE

A great deal of the ecological knowledge of Eskimos centers around the identification of minute differences in ice and snow characteristics. Eskimo children learn experimentally to identify these differences because of their survival value. Collier (29) has described Eskimo traditional education as nonverbal and ecological—facilitating weather prediction, recognition of blizzard warnings, and migratory patterns of game. The best description of the hunting behavior of Eskimos in northwest Alaska is that by Nelson (93), who looks at hunting behavior in an ethological-ecological sense.

Laughlin (76) views the training of a hunter as a biobehavioral system in which the child is programmed into habits of observation, systematic knowledge of animal behavior, and appropriate use of the game for food and other needs. Because hunted animals are often endowed in hunting cultures with spirits or souls, the hunt may be a hazardous period. Thus, the child is taught to have respect for hunting and the prey, to scan, stalk, immobilize, retrieve, and share his fortune with others. The technology of most traditional Eskimo hunters requires that they get close to their prey. How to achieve this represents a lengthy investment in childhood and young adult education. Adults sometimes capture animals to serve as instruction in animal habits and anatomy. Play-acting and sports-like events are given an educative content valuable in the hunt (28, p. 74). Perseverance and toughness are particularly desirable traits (93, pp. 375–76). Generosity, particularly toward kin and meat-sharing nonrelatives, is important and of adaptive value for regions such as the High Arctic where resources are irregular in both quantity and quality.

Eskimos on land must know intimately the behavior of game, but on sea ice they must also know the behavior of the ice itself (93). Such knowledge comes about slowly through the process described above. Eskimos, for example, know that young salt ice (i.e. in the fall) is flexible rather than brittle. When sleds begin to sink, they know that it is best to keep the sled moving and "ride out" the thin ice spots. Eskimos make use of *color* as a distinguishing feature between different types of ocean ice. In inland lagoons, however, color is deceptive because of suspended sediment. Unsafe thin ice tends to be very dark; as it thickens it becomes gray, and from this point on to darker color gradations it is safe enough to support a man and a loaded dog sled (93, p. 16). The use of color distinctions is particularly

useful since it allows an Eskimo to determine conditions ahead of time and to lead his dog appropriately. This method is said to be nearly 100% effective—although not entirely infallible.

Eskimos' avoidance of risky situations and knowledge of ice serve them well, but accidents still occur. In the past, Eskimos went on ice prepared for many types of emergencies. The ice probe (*unaak*) is a safety aid used to avoid being swept by the current underneath the ice or to spread one's weight on thin ice. If one falls through and comes out soaking wet, it is customary to *run* back to the village to keep warm. If too far from a settlement, the hunting partners may lend extra items of clothing until the soaked garments dry. The skin and fur clothing is relatively waterproof, and if powdery snow is available nearby, it can be used to blot the moisture before it soaks in and freezes (93, pp. 24–28).

In addition to his extensive knowledge of the environment, the Eskimo usually is in good physical condition, although not extremely so for an active person. Shepard (105) has reviewed work performance among Eskimo and Ainu populations. There appears to be no appreciable difference between mean values for Eskimo VO_2 Max and those for other populations. In Eskimo performance, patience, experience, and skill in interpreting small signs are more important than a superior oxygen transport system (100). There has been a steady decline in physical capacity in recent years as a result of changing life-styles. Young Eskimos are much less willing to face up to the rigors of the hunting way of life (93).

To cope with snow and ice cover, Eskimos rely on keen observation to avoid unnecessary expenditures of energy and unnecessary dangers. Foresight is particularly crucial, as shown by their unwillingness to travel onto sea ice in winter unless they have carefully excluded all potential signs that they might be set adrift on a loose floe. Nelson has noted that Eskimos seldom act in the Western manner of doing things for the excitement of taking a chance (93, p. 377). Instead, they carefully avoid percentage risks, even when the risk may be as low as 20%. Alertness is also valued, and seldom do they give their full attention to a single activity. Instead, they commonly glance around them and survey their surroundings. This avoids the danger of being carried away by floating ice, presents opportunities for hunting other animals than the one being stalked, and familiarizes each person with his surroundings. Eskimo hunters exercise unusual inventiveness in crisis situations. In one case noted by Nelson, they constructed an emergency sled from pieces of frozen meat (93, p. 378). Cooperativeness in hunting also enhances the survival chances of the individual through pooling of physical effort and environmental knowledge. The common reaction to mistakes is laughter rather than anger, and this helps alleviate the frustrations that are sure to occur frequently in an environment where so much

can go wrong. Many of these traits have begun to disappear with the steady acculturation of Eskimos to Western culture and the adoption of time-saving technologies.

ADAPTATION TO PROLONGED LIGHT AND DARKNESS

Arctic populations are subject to fluctuating light/dark cycles in the spring and fall, and to no cycling at all in midsummer and midwinter (17, 43). This unusual pattern is believed to have a negative effect upon the well-being of the population, including reactions such as arctic hysteria,[6] the physiological basis for which is discussed elsewhere (17, 43, 92, 106a).

Cases of arctic hysteria have been noted as long as outsiders have known Eskimo populations. They were said to be more frequent among women than men, but no one ever gave the matter sufficient attention to permit any assertions on the subject (43). Nachman (91) has suggested that such attacks may have served to socially express role demands. He explains that in the case of women the attacks might provide an opportunity to acknowledge sexual threats and temptations normally not permitted. Men, by the same token, might be able to express fears about their inability to fulfill the responsibilities of married life. Arctic hysteria may have been a way by which Eskimos reacted to intense stress, but Bohlen (17) cites evidence to the contrary. Such stress might be associated with the low and steadily depleting food supplies of wintertime. Wallace (114) has suggested that numerous factors are probably implicated: shamanistic outlets for hostility, hypocalcemic levels resulting from a low calcium diet and low vitamin D synthesis during winter darkness, and anxiety over subsistence.

A great deal of the stress that is implicated in arctic hysteria was relieved through religious practices. Eskimo religion was essentially animistic, where animals and other environmental aspects were imbued with supernatural will and power. Religion, therefore, sought to create a meaningful and peaceful relationship through taboos, ceremonials, and practices that prevented excess slaughter of animals, provided release from tensions, and defined human roles and actions (83). Religion helped Eskimos explain bad weather or reduced game supply (28). Personal guilt and misfortunes could be transferred to the machinations of angry spirits (118). Taboos helped regulate the time for making new clothes, for conserving energy and resources, and for establishing priorities. They might also have helped estab-

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[6]Arctic hysteria, or *pibloktok,* is a temporary mental disorder characterized by alterations in consciousness, memory loss, psychomotor seizures, and other symptoms that resemble epilepsy (43). Bohlen (17, p. 73) believes it may be triggered by low calcium levels when the body requires maximum levels.

lish a circannual rhythm that could help alleviate the disturbances brought about by the light/dark arctic pattern. In this regulation of social activity the shaman played a crucial role. If the shaman could successfully forecast the weather, help cure the ill, bring good luck to hunters, and make game receptive to hunters, he could achieve a measure of respect and even wealth. But if his powers failed to improve the group's life-chances, he might be deposed or killed (118). Thus the group selected individuals who could forecast a number of crucial factors involved in survival and educate the group's members into the proper behavior required for well-being.

One means for coping socially with winter stress was to hold ceremonial feasts where food and other goods were distributed to the less fortunate in the group. The Bladder Festival was held in west central and southwest Alaska. It involved rituals whereby the bladders of the animals caught in the past year would return to the animals and thereby enhance future hunting chances. Shamanistic seances, the mimicking of hunting dramas, and purifications were also part of the ceremonies. The poor and the elderly were accorded special treatment and received a substantial portion of the food and goods distributed (73). Ceremonies that provided relief from sexual tension were also common. The Inglalik Feast for the Dead and the West Alaskan Asking Feast included exchange of favors and sex and ritual exchanges of male/female roles and dress (73). While their purpose was to stimulate animal reproduction and enhance hunters' chances in the next season, they probably helped relieve social and psychological tensions as well (83). The Messenger Feast was a high point of winter, and served to facilitate social and economic exchange (107, pp. 217–28), manifesting numerous similarities to the potlatches of the Northwest Coast.

Western regimentation and diet have facilitated Eskimo adaptation to the light/dark arctic pattern. Eskimos have acquired watches, schools have introduced a scheduling element that strongly socializes the child into the 24-hour rhythm, and the introduction of milk products into the diet has enhanced the calcium levels of Eskimos and facilitated calcium homeostasis. The adoption of wage labor requires being at work at stated times, often according to a schedule more familiar in New York than in the Arctic. These socially prescribed schedules facilitate the physiological performance of Eskimos—although not all the changes have been for the better. Concentration in villages has led to abandonment of traditional housing and adoption of less healthy shelters. Instead of the sod and snow igloos, Eskimos now live in plywood shacks or government-built prefabricated homes heated by coal stoves where air is not properly humidified and the population is all the more susceptible to respiratory infections. This adds to the chronic problem of middle ear disease (*otitis media*) and deafness among Eskimos. Such impairment surely affects the emotional profile of Eskimos

and facilitates their susceptibility to nervous disorders similar to arctic hysteria, and it may be implicated in problems of foreign language learning and school performance (43).

COPING WITH LOW BIOLOGICAL PRODUCTIVITY

The low net productivity of the tundra imposed on the human population of that zone a constraint that they could overcome either by seasonal exploitation of more southerly taiga resources or by exploitation of the coastal resources. Both strategies have been used by distinct groups of Eskimos, but interdependence between the groups was created through need to trade the resources of one group for the other (107, p. 76). The coastal Eskimos lived in small but relatively permanent settlements oriented to the seasonal but regular appearance of large numbers of sea mammals —used not only for food but also for clothing and fuel. Inland Eskimos, on the other hand, were more nomadic and followed the herds of caribou and exploited the fish of the rivers and, in their excursions to the coast, sea mammals. The inland population depended on the coast for supplies of seal oil and other fuels while the coast depended on the interior for caribou skins and plant products, particularly vitamin-rich berries (94). Not much has been made of the Eskimo use of plant foods, but it is known that when berries were available, they were stored in seal oil or in the permafrost (94).

The maintenance of interdependencies among Eskimos was facilitated by flexible alliance systems. Although there was rarely intermarriage across the inland/coastal boundary, an elaborate quasi-kin system evolved that allowed the extension of hospitality and protection and encouraged trade (107, p. 95). Eskimo kinship has been said to be flexible and to permit inclusion of strangers into the network whenever appropriate (22). The flexibility of Eskimo settlements is a response to scattered resources and aims at an increasingly secure subsistence.

Balikci (6) discussed the order and predictability of the Netsilik Eskimo annual round. Table 1 summarizes the resources exploited and the type of groups and cooperativeness associated with each activity (5, p. 10). The single extended family unit was maintained year-round, but other affinal and consanguineal ties led to aggregation when such groupings maximized hunting chances and provided greater security at uncertain periods (i.e. winter).

Winter sealing facilitated the formation of relatively large winter villages made up of several extended families, while summer fishing was a time for efforts by small families. Seal-meat sharing patterns reflected precise rules of cooperation:

Table 1 Reconstruction of the annual migration cycle of a Netsilik subgroup (ca 1919)[a]

Camp no.	Season	Subsistence activity	Cooperation	Housing
1, 2	Midwinter	Seal hunting at breathing holes	Large hunting parties, intense social life, ceremonial activity	Sod, stone, and snow villages
3	Spring	Seal hunting at large breathing holes	Scattered, extended family units	Snow igloos
4	Midsummer	Fishing at stone weirs	Restricted, extended families	Seal tents
5	Early fall	Caribou hunting inland	Cooperation, kyak hunting. Close cooperation between beaters and spearers	Seal tents
6	Late fall	Fishing through thin river ice	Cooperative fishing with leisters	Seal tents

[a] Based on (5, 6).

The seal-meat sharing system functioned as follows: every hunter had a number of sharing partners for each part of the seal meat and blubber . . . Ideally, there were twelve and they were chosen by the hunter's mother either shortly after birth or during his childhood. Whenever the hunter killed a seal his wife cut up the animal and gave the appropriate parts to each one of his partners' wives (5, p. 125).

Partners named each other by the name of the part of the seal exchanged, and this reinforced the sense of cooperation required during the long dark winter months. What is of great ecological and social interest is that close relatives and members of the same commensal unit could not become partners. Only distant kin or nonkin were eligible, thereby extending the network of subsistence and overcoming the hostility that was often directed at those outside the extended family in Eskimo behavior (5).

Exploitation of the scarce and sometimes fluctuating resources necessitated the practice of population controls to adjust the size of families to the capacity of the provider and enhance the survival of the living and productive members of the group (1; 6, p. 81). The most common practice of population control was female infanticide.[7] Eskimos gave cultural preference to boys and considered girls to be less productive than boys, the hunters. Thus, normally families tried to maximize their number of boys,

[7] Although Spencer (107) notes that coastal Eskimos practiced sexual abstinence in late winter to assure success in the hunting of whales, Freeman (44) proposes cultural and ecological factors for Netsilik Eskimo infanticide. Schrire & Steiger (103) imply that infanticide serves group level adaptation, but question whether more than 8% of female infants could be killed without endangering the population's survival.

although in times of stress male infants were killed as well (5). Female infanticide may have taken into account the higher death rate of males who, while hunting, froze to death or were killed in disputes. Suicide, senilicide, and invalidicide also served as means by which there was cultural pressure to eliminate unproductive members of society—a task that the nonproductive individuals often allocated to themselves through voluntary abandonment (107, p. 82). One should not assume that female infanticide and other population controls were evenly practiced throughout the Arctic. As one moves to areas where winter ice prevents access to intertidal areas, the old, the infirm, and the young become potential candidates for abandonment and exposure to the elements (34). One does not find these practices as often in areas where these three subgroups can obtain a sizable portion of their own food supply, in particular shellfish (77, p. 242). When such intertidal areas or coastal resources are not available, a feedback process may go into effect by which the population adjusts to the leanest months of the year and to the areas with the least resources. Prolonged nursing, abortion, sexual abstention, as well as infanticide, may all be utilized to limit the numbers of people.[8]

Implicated in the practice of senilicide may be a pathological condition in aging Eskimos known as bone resorption. While the causal factors are not well established (85, 121), the condition is known to lead to increased frequency of vertebral fractures. Such increased impairment which would cripple the aged person would have put a major drain on seminomadic communities. By way of contrast, coastal populations could store food for lean times, and such sedentariness permitted the old and infirm to continue contributing to group subsistence instead of becoming burdens (107, pp. 92–95). Laughlin has pointed out that the richness of the Aleut intertidal ecosystem permitted greater longevity and that older Aleuts played an important role as "consultants and cultural librarians" (78). Table 2 illustrates the greater number of persons to survive to ripe old age in the Aleutian Islands compared to Labrador Eskimo populations. While these are not appropriate High Arctic samples, they do suggest the need for further research on arctic demography.

Three social features have been noted in the Arctic that enhance the adjustment of the human population to the more marginal areas of the Central Arctic: institutionalized adoption, child betrothal, and spouse exchange (33). Through adoption the population can be redistributed accord-

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[8]In humans, prolonged lactation only incompletely suppresses ovulation. Birdsell has suggested that the demands of nursing a previous child and of mobility may have made it necessary to kill 15 to 50% of the children born (12, p. 243). Schrire & Steiger (103) estimate a maximum figure of 8%.

Table 2   Age at death in populations of Aleuts[a] and Eskimos[b]

Age groups	Number	Aleut percent	Number	Eskimo percent
1–15	150	30.55	38	34.55
15–25	41	8.35	10	9.09
25–45	103	20.98	29	26.36
45–65	117	23.83	20	18.18
65–80	58	11.81	13	11.81
80–100	22	4.48	0	0.00

[a] Aleuts of the Aleutian Islands (78, p. 386).
[b] Eskimos of Labrador (78, p. 386).

ing to sex as well as into viable units for specific areas. The value of child betrothal is tied to the practice of female infanticide. A male could assure himself of a spouse by arranging to marry a female infant. This might also free him to give full attention to hunting rather than spending time in search of eligible females. Spouse exchange is sometimes cited as a means to extend one's kinship network through the mechanisms of exchange and cooperation (107). Damas (33) suggests that it may also alleviate the tensions of monogamous sexual life. All three features helped regulate the size of groups and their reproduction and affirmed their cooperation in the search for scarce resources.

Despite the absence of plants in their barren tundra surroundings, the High Arctic Eskimos practicing a traditional subsistence pattern had a nutritionally adequate diet. The major portion of the native diet consisted of seal, walrus, whale, caribou, and fish—a diet high in protein and fat but very low in carbohydrates (35, 36, 94). This native diet, when prepared in a traditional manner, was capable of furnishing all essential nutrients (35, 36). For useful reviews of nutritional research among arctic populations, see 8, 9, 35, 36, 106a.

The well-being associated with this native diet—low blood pressure, low blood cholesterol, and lean body mass—has changed in the last 20 years. Today the health status of the Eskimo more closely resembles that of Western industrial populations. A greater proportion of the calories consumed are now derived from carbohydrates—especially breads, cereals, rice, and sugar. Over one-half of the fat currently used is imported, primarily in the form of hydrogenated shortenings and margarine. Vitamin C is in greater scarcity than before as a result of changes in cooking patterns. Anemia is now a frequent nutritional problem. Obesity, especially among females, is found with greater frequency. Hypercholesterolemia is increasing among all, particularly in the aged (9, 115, 121). Increased opportunity to obtain sweets and less frequent use of the teeth as tools have led to a rapid increase in periodontal diseases and dental caries. On the other hand, the

new diet is possibly implicated in the accelerated growth trends noted by Jamison (65)—a pattern that reflects an increased alienation of Eskimos from the limits of their environment and increased dependence on subsidies from outside.

Kemp (68, 69) has studied the flow of energy among contemporary Eskimos. Although he limited his energy measurements to two households, the model he came up with sheds light upon systemic relationships and Eskimo success in coping with low biological productivity. Modernization has led to considerable energy subsidies from outside in the form of store-bought food, gasoline, wages, and cash from art objects sold. These subsidies permit the maintenance of a larger population than before. Sedentarization is encouraged, a decreasing amount of time is spent in hunting, and ever-increasing amounts of energy are processed, with much of it lost as heat. Hunting with motorized vehicles is reasonably efficient. Kemp found that for an expenditure of 1.75 million kilocalories, the Eskimos studied obtained 5.29 million kcal—a 3:1 energy efficiency. But it means that the distance traveled is increased. Most of the calories today come from wage labor, the carving of sculptures, and skin-preparation—activities which give an even better return per unit of energy invested. The impact of the Trans-Alaska pipeline had not yet begun to be felt, but it surely means an increased flow of energy in and out of the system, although much it probably bypasses Eskimo participation (23).

CHANGE IN THE ARCTIC

Ever since the first Eskimos came in contact with whaling ships in the 1870s, their culture has been changing, but it is only in the last 20 years that hunting has declined as a way of life while whaling has increased. Since then, a steady erosion of Eskimo adaptive practices has taken place (10). The acquisition of rifles has meant that subsistence could be secured at a faster rate than before, and the desire for Western goods demands that they work for wages so as to buy them. Despite the boom conditions in Alaska, most jobs have gone to skilled outsiders. The result has been an annual unemployment rate, adjusted for seasonal factors, of close to 70% (23). Several factors are at work, but most significant are Western education and technology. Instead of the experiential ecological education of yesteryear, modern Eskimos attend schools where education is geared toward gaining literacy by reading the wisdom of non-Eskimos. Specially influential are boarding schools that separate children from parents at a crucial time in their education as hunters. To a large extent, the influx of outsiders to the Arctic and the presence of non-native teachers have caused children to lose

respect for their traditional social and cultural values and practices. They have also learned the Western ways to become successful, and an appreciation of technological innovations, instead of guarded disapproval for change. Today, ritual regulation of human acts toward nature have almost disappeared (60).

The Eskimos, like the Laplanders, adopted the snowmobile with astounding rapidity (106). The snowmobile was developed in 1962, and since that time sales in North America have grown 2500%, and 50 manufacturers market 400 different models to supply this persistent demand (62, p. 908). Osburn (95) studied the adoption of snowmobiles among the *nunamiut* Eskimos of Anaktuvuk Pass, Alaska. Before the 1960s the population had been seminomadic caribou hunters. In 1964, the first snowmobile appeared and brought about intense jealousies among the group. For caribou hunters it was advantageous because the caribou appeared to be less afraid of its noise than of the dog teams. By 1969 the switch from dog sledding to snowmobiles was complete. Bliss (14) estimates the annual cost of a dog team at $12, while a snowmobile costs $1,075 in depreciation and operating costs. But Eskimos spent considerable effort in hunting meat to feed their dogs. In switching, all the hunted meat became available for consumption or sale. Dogs were neglected and slowly disappeared. Eskimos stopped walking and drove everywhere in their machines, even if it was only one block away in the village. Such overuse eventually took its toll, and the machines began to fall into disrepair. Lacking the capital to replace them and the know-how to fix them, the people were increasingly dependent on outside handouts and wages. But the hunting style was abandoned, and what remained bore little resemblance to the Eskimos of the past.

The change was just as rapid among the Finnish Lapps (80, 90, 97). As with dogs, reindeer sledding was abandoned within a couple of years, and the snowmobile became universal. The major difference was that the Lapps continued to herd reindeer and, in their minds, more effectively so with the snowmobiles. Before the arrival of the snowmobile, Lapps had year-round contact with herds and could easily make herd management decisions. But with the adoption of the snowmobile, pressure has been built to hold several roundups yearly instead of only one. This is in response to market demand for their product and because of the demands to meet payments on their acquired snowmobile equipment. Linkola (80) estimated that one-third of the reindeer sold yearly are required to purchase and maintain existing snowmobiles. The result has been a steady depletion in the size of the herds (see Table 3). The snowmobile has enhanced differences between people in the Arctic, with the small herder and operator having to abandon his occupation to become a full-time wage earner to sustain his family and new

Table 3 Patterns of reindeer sales and herd growth in a Lapp community before and after the use of snowmobiles[a]

Period	Reindeer slaughtered and sold	Net increase in herds
1956–1961		
By owner A	25.5%	1.7%
By owner B	15.5%	34.4%
By owner C	22.7%	13.5%
By all 104 members	23.7%	7.8%
1963–1969		
By owner A	43.7%	−16.8%
By owner B	32.6%	−17.4%
By owner C	43.0%	−20.2%
By all 111 members	32.7%	−10.0%

[a] Owners A, B, and C have the largest herds in Utsjoki (63).

machinery. In addition, the snowmobile scars the Arctic. Ecologists have noted that plant recovery is slow where snowmobile tracks have been cut as far back as 10 years ago (14).

An important issue in recent years has been discussion of the application of techniques to ameliorate arctic climate. There is no doubt that it is climate which most inhibits the development of the Arctic. The outlook at present is not particularly encouraging. Efforts to produce rain have given poor results. A Bering Straits dam has been mentioned as an effort to warm the Arctic, but engineers lack sufficient knowledge to undertake such a project, and it could have deleterious effects elsewhere. At this time it appears that regional climatic modification is untenable (82, p. 338). Local microclimate modifications may be possible, however. Whether such efforts would be desirable or economical is another question. Snowmelt may be accelerated by appropriate artificial dusting or inhibited by artificial insulation. Snow fences, i.e. the use of trees as snowbreaks, can increase or decrease snow cover depending on location. Powdered coal, sprinkled over the ground, may increase soil temperature by tapping solar energy (82).

It is most unlikely that outdoor agriculture will be of much consequence in the tundra-covered areas—barring some unforeseen and spectacular breakthrough in technology (25). Even when good arable soils are available, the climate is unsuitable for most crops domesticated heretofore. As facilities improve, transportation systems can bring produce from favorable areas, and this is likely to further inhibit the economic basis for developing agriculture in arctic zones. The development of the Arctic in the foreseeable future will follow an extractive path, and it can only be hoped that the effect

will be different from what it was in the Amazon Basin rubber boom of the late nineteenth century, which ended with the region still undeveloped (87a).

CONCLUSIONS

An evaluation of the impact of the proposed Trans-Alaska pipeline conducted by the Bureau of Indian Affairs concluded that, although the pipeline did not cut across a sizeable number of Eskimo villages, it would increase the pace of acculturation and absorption of Eskimos into Western culture (23). The impact of change in its initial stages is seldom kind, and thus far its impact on Eskimos from a cultural and ecological point of view can only be said to have been unfavorable. The health status of Eskimos has declined—anemia, obesity, higher blood pressure, hypercholesterolemia, loss of teeth—without a marked improvement in the persistent problems of otitis media, gastroenteritis, respiratory ailments,[9] and eye damage (115, 121). In schools, Eskimos are slow to learn because of a combination of chronic hearing impairments, passive teaching techniques, and a lack of respect by non-native teachers for their Eskimo pupils (29). Technological improvements such as snowmobiles have been adopted before adequate knowledge of engine repair and vehicle maintenance were provided. The result has been neglect of traditional transportation means and increased dependence on wages to keep up an expensive technology that most Eskimos cannot afford because of unemployment.

According to Smith (106), Eskimos can still live off the land by hunting on weekends and keeping a job during weekdays. But new problems arise. Because the snowmobile permits more distant trips, there is greater danger of being stranded too far to be able to get back on foot. The speed of snowmobiles increases the danger of frostbite from the combined effect of cold and wind from the speeding vehicle. The driver of the snowmobile cannot see if anyone traveling on the sled behind him has fallen, and cases have been noted of companions being frozen to death after falling from sleds.

Eskimo interpersonal relations have changed a great deal, but recent events have brought on a renewal of Eskimo traditions. Following a lengthy transitional period (1850s to 1960s) in which Eskimo kinship networks broke down as families settled among strangers in villages, it is amazing that any aboriginal customs have survived (21). Modern advances in communications equipment available to the mass consumer have facilitated a return to activation of wide kin networks. Most Eskimos in Northwest Alaska

[9]Except for a sharp decline in the incidence of tuberculosis.

have tape recorders and use them to make recordings for relatives in distant villages. Relatives who have never even met are included in these tape networks which integrate the Eskimo population. Another crucial change is the construction of landing strips in most villages and the use of charter flights to attend, en masse, cultural events in other villages. While Eskimo economic behavior is increasingly Western, a great deal of the kinship obligations are still operational and appear to be on their way to a revival. For a full discussion of these changes, as seen among the Northwest Alaska Eskimos, consult Burch (21).

A recent Inuit Circumpolar Conference[10] gives evidence of efforts by Eskimos to act jointly to preserve their cultural heritage, gain a voice in how their environment is exploited, and agree on conservation measures that allow them to sustain a hunting way of life in the modern world (88). Despite initial difficulties in communication, the Inuit responded in unified resolutions. Whether this growing unity is translated into a growing control over their destiny remains to be seen. But the goal of a renewed Inuit life-style more closely attuned to the opportunities and limitations of the arctic environment is a hopeful one. The influence of outsiders has thus far meant a replacement of adaptive behavior by technological subsidy. Such a subsidy is expectable only as long as the area continues to yield high-value nonrenewable resources. Once they have been extracted, the Arctic will need once again the ancient strategies of Eskimo populations. We can only hope that the adaptive value of such a life-style is recognized and nurtured by both Eskimos and outsiders.[11]

The bulk of the mechanisms for human adaptation to arctic areas are social and cultural rather than acclimatory, developmental, or genetic (101). Housing and shelter provide effective regulatory adjustments to cold stress and create microenvironments of relative comfort. These are supplemented by acclimatory and developmental adjustments that protect the extremities: nonshivering thermogenesis, high rate of peripheral blood to the extremities, and high core-to-shell conductance. A remarkable adjustment, whose origin is not fully understood, is the calorically expensive but effective higher basal metabolic rate of the Eskimo. Adjustments to a snow environment, to prolonged periods of either light or darkness, and to the low biological productivity of the Arctic are regulatory in nature. Traditional education emphasized observational expertise, knowledge of animal

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[10]The term Inuit is rapidly replacing the term Eskimo. In this review the older term is used because it is more familiar to the non-Arctic specialist.

[11]Bruemmer (18) has produced a beautiful and sensitive photographic essay that effectively captures the adaptability of the Eskimos to the Arctic.

ethology, and careful avoidance of risk. In combination, these adjustments were conservative measures for preventing accidents in an environment where death can come quickly in either freezing water or cold snow. Adjustments to prolonged light and darkness cycles were social and cultural in nature. The traditional animistic religion helped reduce anxiety over resources, signaled the time for social aggregation during the peak of winter, and through rituals and feasting created an artificial 24-hour daily rhythm that may have helped prevent disruption of physiological functions and reduce the frequency of arctic hysteria-like incidents. The low biological productivity of the tundra was dealt with by the exploitation of animals whose diet is not based on tundra plants: sea mammals, fish, and land animals that exploit during winter the forest resources to the south. Marriage practices, adoption, spouse exchange, and meat-sharing partnerships all helped extend the network of friendship and reciprocity, thereby improving the life chances of individuals and nuclear families scattered over the vast arctic zone. Population controls helped maintain a balance between resources and population.

While the discussion in this review has emphasized the identification of crucial constraints to human adaptation and discussion of the adjustments that facilitate human adaptability to such constraints, it should not be forgotten that these constraints occur simultaneously and influence the type of adjustment that results. For example, both high altitude populations and arctic populations are exposed to cold stress (27, 49, 98). They both share nonshivering thermogenesis and peripheral blood flow to the extremities. High core-to-shell conductance and higher basal metabolic rate, however, are found only among arctic populations. To understand this difference in human adaptation to cold we must look at the other constraints under which high altitude and arctic populations operate. While arctic populations exploiting coastal sea mammal resources were rarely exposed to hypocaloric stress, high altitude populations seem to have been regularly exposed to it. This means that adaptations to cold at high altitude had to be energy-saving rather than energy-costly, while in the richer marine areas of the arctic environment, caloric considerations were relatively unimportant. Similar interacting effects are possible for a number of other problems discussed in this review, but they have not been researched adequately to date.

Research on arctic zones needs to continue because of the importance of understanding how social and cultural adjustments function jointly with physiological responses to stressful conditions. Current economic conditions in the Arctic provide an unusually interesting natural laboratory—given the presence of both native peoples and large numbers of recent migrants. Because most of the adjustments are social and cultural, the

problem is not the danger of losing important genetic adaptations, but rather of losing the delicate knowledge of arctic natives about their environment and of submerging an environmentally fine-tuned people under the weight of imported technological advances whose impact upon the arctic ecosystem is not understood.

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HUMAN BEHAVIORAL ECOLOGY

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INTRODUCTION

Human behavioral ecology may be defined as the study of the evolutionary
ecology of human behavior. Its central problem is to discover the ways in
which the behavior of modern humans reflects our species' history of natural
selection. During the last two decades this approach has grown rapidly,
involving researchers from all the major branches of anthropology, as well as
from other behavioral and social sciences and from the humanities. This
article focuses on the growing body of empirical behavioral ecological re-
search on behavior in non-Western, primarily nonindustrial societies. Studies
that have brought new insights to areas of traditional concern among an-
thropologists, such as population regulation, foraging, reciprocity, redistribu-
tion, kinship, marriage, descent, child care, and sociocultural change are
emphasized.

The evolutionary biological study of human behavior has been given many
other names besides human behavioral ecology, including evolutionary ecolo-
gy, biosociology, biocultural science, biosocial science, human ethology,
sociobiology, socioecology, evolutionary biological anthropology, and evolu-
tion and human behavior studies. Many researchers now avoid the con-
troversial term "sociobiology" because it is often wrongly equated with kin
selection theory (93), which is actually just one aspect of the approach, and
because they wish to distance themselves from popular and speculative works
that use the label.

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ORIGINS OF THE APPROACH

Human behavioral ecology, as it is practiced by anthropologists, developed out of three main theoretical traditions. First, it followed in the footsteps of the evolutionary biological approach to animal behavior that developed in the 1960s and 1970s out of ethology and population biology. Previously, ethology had been concerned mainly with the immediate functions and proximate determinants of behavior, while population biology had developed theoretical models of the natural selection of behavior. The debate over levels of selection inspired by the work of Wynne-Edwards (192; cf 187) and Hamilton's (93) theory of kin selection were two of the most important developments, soon followed by new theories of reciprocity (170), parental investment (172), foraging strategies (135), and mating systems (145), and by many field studies. Wilson's *Sociobiology*, although widely seen as the opening salvo in a scientific revolution, was for the most part simply a codification of a large body of existing theory and research.

Second, human behavioral ecology developed partly out of and partly as a reaction to earlier types of ecological anthropology. The foundation was laid by such cultural ecologists as Steward, Carneiro, and Netting, who established the relationship between human societies and their environments as a legitimate subject for study. Later, such neofunctionalist ecological anthropologists as Roy Rappaport, Marvin Harris, and Andrew Vayda pioneered the use of ideas from evolutionary biology and ecology. However, some anthropologists grew dissatisfied with the neofunctionalists' emphases on energy and homeostasis, and especially with their use of controversial ideas about group selection and population regulation (192). Such scholars began to study the debates among evolutionary theorists about levels of selection, animal social behavior, sexual selection, and related topics. Further impetus came from earlier work by anthropologists such as Alexander Alland, Lionel Tiger, and Robin Fox, from work by biologists such as Earl Count and Robert Hinde on the biological bases of human behavior, and especially from Alexander's use of the ethnographic record to explore the implications for the social sciences of evolutionary biological theory (2).

Finally, the development within anthropology of actor-based, methodologically individualist approaches and the use of game theory dovetailed well with the growing emphasis in evolutionary biology and animal behavior studies on individual-level selection and the strategies of individual organisms. For example, Fredrik Barth's social exchange approach is similar to reciprocity theory (170) and F. G. Bailey's use of the game metaphor in his study of political strategies is akin to the use of game theoretical models in evolutionary biology and animal behavior studies (see 146).

The development of human behavioral ecology has been accompanied by a

great deal of controversy, with criticisms coming from a variety of fields (e.g. 124, 153). Much of the argument has concerned the possible ethical and moral implications of research into the evolution of human behavior, with a great deal of confusion surrounding the notions of "natural" and "good." The idea that what is natural is good is known as the naturalistic fallacy, a violation of the principle that one cannot derive moral statements from facts because statements about what *is* are fundamentally different from those about what *ought to be*. Discoveries about the natural histories of human behavioral patterns say nothing about either their desirability or their inevitability for our species. Rather, human behavioral ecology can make important contributions to the study of the causes of a variety of modern social issues, including conservation, population, child abuse and neglect, violence, divorce, and many clinical psychological problems.

THEORY AND METHOD OF HUMAN BEHAVIORAL ECOLOGY

Genes, Environments, and Behavior

It is possible to link human behavior and evolutionary biological theory in at least two ways. First, in the "strong sociobiological thesis," (88) correlations between genetic variations and behavioral variations are sought in order to explain behavioral variations. For example, Freedman (83) has uncovered behavioral differences among newborns from three different populations that may be due to genetic differences among the populations since they appear too soon after birth to be the products of cultural conditioning. Alternatively, in the "weak sociobiological thesis," variations in human behavior are seen as expressions of a human genotype that is essentially similar across human populations but that has endowed our species with psychological pre-dispositions, mental capacities, and physical abilities that have tended to be adaptive in the environments of human evolution, with "environments" un-derstood to include individuals' cultural and social situations. With a few exceptions most human behavioral ecologists subscribe to the weak thesis (e.g. 117). According to proponents of the weak thesis, the nature-nurture debate is illogical. Human behaviors are seen as phenotypes that, like all phenotypes, are the combined outcomes of interactions between genes and environments. Our species' remarkable behavioral plasticity and its capacity for culture are seen as outcomes of our evolutionary history.

Levels of Selection

Natural selection could, in theory, act at a series of levels ranging from single alleles, to individual organisms, to entire populations, and even to the bio-sphere (162). Much of the impetus for the development of behavioral ecology

came from a debate over levels of selection sparked by the work of V. C. Wynne-Edwards (192). Wynne-Edwards argued that the threat of overpopulation was a common and strong force for selection at the level of the group, and that such common behaviors as flocking, territoriality, the formation of dominance hierarchies, altruism, and reproductive restraint were the result of selection that favored the survival and reproduction of the group over that of the group's individual members.

Evolutionary biologists and ethologists criticized Wynne-Edwards's ideas on both empirical and theoretical grounds. Lack pointed out that the apparent reproductive restraint noted by Wynne-Edwards among birds can be more parsimoniously interpreted as the result of selection favoring benefits at the level of the individual. Lack showed that although many birds appear to be fulfilling the predictions of Wynne-Edwards's theory by laying fewer eggs than they are capable of laying, such birds are simply prudent: Eggs laid in larger clutches suffer higher mortality than eggs laid in smaller clutches, and the most common clutch sizes are the ones that produce the greatest number of fledglings (127). Hamilton (93) showed that natural selection at the level of the gene could lead to the evolution of altruistic, self-sacrificial behaviors if the altruist and the beneficiary were related by common descent. Trivers (170) argued that natural selection might favor altruistic behavior, even towards nonrelatives, if the altruist has a high likelihood of being repaid. Finally, it was shown that group selection requires unusually low amounts of migration between populations and unusually high rates of extinction of entire populations, making it an unlikely event in natural history (187). Although the debate over group selection is not over (e.g. 36, 71), the current consensus among human behavioral ecologists is that although selection has the potential to act at a variety of levels, it is likely to act most significantly at the lowest levels—i.e. upon genes and their individual bearers. Selection at higher levels is now seen as an explanation of last resort (88).

The implications of the emphasis on selection at the level of the individual can best be demonstrated with an example. Anthropologists have often cited !Kung San women's wide birth spacing, which averages about four years, as support for the idea that hunter-gatherers homeostatically regulate their populations, but reanalysis of this phenomenon in light of Lack's work on bird clutch sizes suggests that !Kung mothers' apparent reproductive restraint may be an illusion. Like Lack's birds, !Kung mothers appear to be acting prudently by having babies seldom. Children born to !Kung mothers who use shorter interbirth intervals suffer higher mortality than those born to mothers using longer interbirth intervals, and the most popular interbirth interval is that which maximizes the rate of production of surviving offspring. Far from controlling population, !Kung women appear to be having children as fast as possible (27; cf 148; see also 152).

Levels of Explanation and Cultural and Biological Success

Behaviors can be explained in a variety of complementary ways at different levels of causation (139). Proximate explanations deal with the physiological and psychological mechanisms and culturally transmitted knowledge behind behaviors. Ontogenetic explanations focus on how behavioral patterns and the proximate mechanisms behind them develop over the life course of the individual. Ultimate or distal explanations concern the adaptive significance of behaviors. Phylogenetic explanations concern the evolutionary histories of traits. It is also possible for several valid explanations for a behavior to coexist on any one of these levels. Human behavioral ecology's main interest is in deciphering the ultimate causes of behaviors by examining their reproductive consequences in living populations and by determining their adaptive significance for our ancestors. Explanations of behaviors on more proximate levels are essential to this effort, and increasing interest is being shown in the integration of explanations at different levels of causation (9).

This point helps to clarify the relationship between human behavioral ecology and sociocultural anthropology. Human behavioral ecologists have focused on the question of how individuals achieve reproductive success and related goals, while sociocultural anthropologists have focused primarily on cultural influences on behavior. A growing body of research has shown that these emphases are usually complementary. Irons first proposed that "in most human societies cultural success consists in accomplishing those things which make biological success...probable," and that therefore success in achieving culturally defined goals should tend to correlate with reproductive success (116, p. 258). Irons tested his model on the Yomut Turkmen, finding that men in the wealthier, culturally more sucessful half of the population had significantly more surviving offspring than men in the poor half. Irons's initial test has been followed by cross-cultural studies (16, 109) and by a series of sophisticated tests in a wide variety of societies, including the Hausa (see 9), Yanomamö (48, 49), Mormons (140), wealthy Americans (73), Ifalukese (178), Ache (112), Trinidadians (77), 18th century English (113), Kipsigis (30), 19th century Swedes (133), 18th and 19th century Germans (181), and Mukogodo (57). In this group of societies success is defined not only in terms of wealth accumulation but also in terms of such things as hunting success (112), skill in warfare (49), position in a religious hierarchy (140), or adherence to an ethos of self-control (see 9), providing strong confirmation of Irons's original hypothesis (cf 109, 152, 179).

Increasing attention is being paid to the exact nature of the links between cultural and reproductive success, including effects of wealth on polygyny rates, female fertility, and offspring survivorship; possible confounding variables; and the possibility that the correlation between wealth and reproductive success could be due to the economic productivity of wives and children

(e.g. 30, 57). Irons originally offered this hypothesis as "a starting point for looking at institutionalized human behavior as individual-level adaptation," and it should be treated as such. The empirical support it has received helps to justify the more general project of human behavioral ecology.

Optimization, Games, and Strategies

In order to study complex behaviors in a complex world, human behavioral ecologists rely on simple models (162). Optimization models and games are two common types. Optimization models are built around a hypothetical actor faced with a range of behavioral options and a set of constraints. The actor's success or failure is measured in terms of a currency—ideally, reproductive success but often some other proxy currency. An actor's tactics for optimization of benefits are conceived of metaphorically as strategies, analogous to strategies used by investors or game players (88). Optimization modeling allows researchers to generate a series of testable hypotheses regarding an actor's options, constraints, and goals, allowing them to continually gauge their own success in explaining the actor's actual behavior. Optimization models are easiest to construct when the actor's environment can be assumed to remain relatively fixed regardless of the actor's own behavior. When the actor's environment instead consists largely of other actors whose behaviors are contingent on the actor's behavior, game theoretical models are called for.

Lifetimes as Effort

From an evolutionary point of view, lifetimes are about the reproduction of genetic material, and they can be analyzed in terms of how they are structured toward that end. Lifetimes are composed of two main types of effort: somatic and reproductive (3, 187). Somatic effort consists of an organism's investments in its own growth, development, and maintenance. Reproductive effort consists of an organism's investments in the project of replicating its genetic material, either directly through its own descendants or indirectly through individuals related to it by common descent. Direct reproductive effort can be further divided into mating effort and parental effort. The following sections are based on this division of effort. The first describes studies of human somatic effort, primarily analyses of foraging behavior. The second concerns reproductive effort, which is further subdivided into direct reproduction (with subsections on mating and parenting) and indirect reproduction.

SOMATIC EFFORT

Resource Acquisition

FORAGING STRATEGIES   The behavioral ecological study of foraging strategies has been centered primarily on a family of related models known

collectively as optimal foraging theory. Many different optimal foraging models have been designed to deal with such aspects of forager decision-making as what they should eat (diet breadth or prey choice), where they should forage (patch choice), where they should live (habitat or settlement choice), with whom they should forage (group size), and how long they should forage (time allocation). Most of these models share a number of features, including a theoretical basis in the theory of natural selection, the use of proxy currencies (usually calories) in place of fitness to measure the success rate of different foraging strategies, and the assumption that selection favors maximal net rate of return to time spent foraging.

The early 1980s saw the publication of optimal foraging analyses of hunting group size among the Inuit (157) and diet breadth and patch choice among the Cree (188), Alyawara (144), Ache (104), and Siona-Secoya, Ye'kwana, and Yanomamö (92). Because those studies have been reviewed and criticized elsewhere (34, 44, 121, 158), here I focus instead on more recent, less familiar studies that have gone beyond the traditional assumptions and limitations of optimal foraging theory.

One of the advantages of working with clear-cut, almost procrustean models such as optimal foraging theory is that it is easy to see when peoples' behavior does not fit the theory. Such failures of the theory can be especially enlightening. The foraging decisions of the Bari of Venezuela are a case in point (12). The productivity of Bari fishing and hunting varies with monthly rainfall patterns, and, in general, the Bari spend more time fishing when this activity is more productive than hunting, and more time hunting when the reverse is true. The puzzle is that they never abandon hunting entirely, even in months when the return rate from fishing is several times better. The problem is not with the foragers, but with the simple initial model, which considered only gross seasonal variations in resource availability. Because the Bari environment is temporally fine-grained, day-to-day variations in the availability of good fishing sites must also be considered. The Bari themselves say that they hunt a lot simply because of these variations: Even in the dry season when fishing returns are highest, daily variations frequently lower the probable return rates for fishing and make hunting a more attractive option. And, finally, some men prefer to hunt rather than fish because they happen to be better at it, suggesting the need to incorporate individual differences in foraging skills into future studies.

Many optimal foraging models may also be too simple in their reliance on calories as a proxy currency for fitness. In some cases, calories may be easy to obtain, and other, scarcer nutrients may be more important determinants of foraging patterns. For example, three different groups of South American foragers, the Cuiva (Hiwi) of Venezuela, Ache of Paraguay, and Yora (Yaminahua) of Peru, sometimes forgo plant foods with high caloric returns in favor of meat, suggesting that a desire for proteins and fats may at times

outweigh the need to forage efficiently for calories alone (110). This problem has been modeled mathematically using both linear programming (13) and indifference curves (110, 121). To test the utility of the latter method, Hill (110) derived indifference curves for meat and carbohydrates from the observed preferences of three groups of South American foragers and used them to predict the exchange values of meat and carbohydrates among the Mbuti. The results were mixed. While the Mbuti data agree fairly well with predictions based on the behavior of the Ache and Cuiva, the Mbuti obtained a significantly larger proportion of their calories from meat (30%) than predicted by Yora indifference curves (17%). Although this is an enlightening first step toward the incorporation of nutrients into optimal foraging studies, the indifference-curve method is essentially inductive, and by itself can do little more than provide post hoc descriptions of observed behavior. We now need predictions of indifference curves based not solely on observations but on an understanding of the relationship between diet and fitness in different environments (110; see also 121). Behavioral ecologists have also studied many other aspects of the strategies of human foragers, but space does not allow a full treatment of them here. The most notable are the idea of the original affluence of foragers (see 44), egalitarianism (41, 185), spatial organization (see 46), sex differences in foraging strategies (see 112, 121), the effects of different foraging technologies (8, 188, 111), predator-prey relationships (189), reproductive and social aspects of foraging (7, 112), and the overkill hypothesis for Pleistocene extinctions (see 188).

BEYOND FORAGING   Although foraging has dominated the behavioral eco-logical study of resource acquisition, there is no a priori reason why a similar approach could not be taken to other types of resource acquisition, such as horticulture and pastoralism. Hames (90) compared time allocated to garden-ing, hunting, and fishing among several groups of Amazonian Indians, arguing that Amazonian horticulturalists may face trade-offs between settle-ment stability, which may increase yields from gardens but deplete local game populations, and settlement mobility, which may increase yields from hunting but decrease the efficiency of gardening. Hames also suggests that since gathering appears to be less efficient than hunting in Amazonia, horticulture may have been pioneered by women as a way to increase their productivity (see also 123).

Pastoralism also provides many opportunities for the expansion of be-havioral ecological studies of somatic effort. R. Dyson-Hudson (70), for example, has developed an ecological explanation for the flexibility of social and residential patterns among the Ngisonyoka Turkana of Kenya, and De Boer & Prins (62) have used optimal foraging models to study decision-making by cattle herders in Burkina Faso. Models of predator-prey relations

may also provide insights into herd management, and field studies of both wild ungulates and modern human foragers may help us to understand the process of domestication.

Resource Distribution

SHARING, RECIPROCITY, AND TRADE   Anthropologists and evolutionary biologists have long shared an interest in the reciprocal sharing of resources (103). Human behavioral ecologists have suggested a variety of reasons for food sharing in specific situations, including the sexual division of labor, sex differences in foraging and reproductive strategies (121), and genetic related-ness (23; see below). Much recent research on food sharing among foragers has focused on the importance of risk and uncertainty in situations where returns from foraging vary unpredictably (e.g. 42, 160). For example, Kaplan et al (122) have argued that foods are shared among Ache nuclear families according to how variable their acquisition rates are, with the most variable foods being shared most often, in order to even out day-to-day variations in food availability. For example, variations among Ache families in meat acquisition are greater than those for plant foods, and although only 8–72% of plant foods are shared outside the nuclear family of the acquirer, 87–95% of meat is so shared. Band-level sharing has demonstrable nutritional benefits for Ache individuals, as well. Couples and single males, for example, in-crease their nutritional status by 80% when their bands share all types of food. Although good Ache hunters seem to be supporting poorer hunters, good hunters do reap important benefits, including more extramarital sex and higher offspring survivorship (see also 112). Risk and uncertainty have been emphasized in studies of sharing among as well as within bands. For example, work on traditional exchange networks among the San/Basarwa (42, 186) has highlighted their importance in risk pooling in variable environments. Such networks may also be the precursors of trade among economic specialists, as on the Botletli River in Botswana, where habitat diversity has encouraged the development of trade between foragers and farmers (43).

In some situations what appears to be reciprocity may be something very different: tolerated theft (26). Theft toleration is predicted when a resource is found rarely, unpredictably, and in large units. Such conditions would set the stage for contests between individuals who possess large amounts of a re-source (e.g. a large animal) and individuals who have little or none of the resource. If the costs of defense of a portion of the resource are higher than the value of that portion of the resource to its owner, then the owner should tolerate theft. Although Ache food sharing patterns are not consistent with this model (122), it may be relevant to food sharing among the Yanomamö (91). For example, rasha palm, a semi-cultigen, is shared widely within Yanoma-

mö villages, despite the fact that it is a reliable and low-risk source of food. This may be because rasha is easily and often stolen: It is better to preempt the thieves by distributing the food oneself than to get no credit for one's generosity. The theory of tolerated theft has important implications for such topics as egalitarianism, food storage, and forager work patterns. However, problems lie in distinguishing the tolerated theft model from models of risk avoidance (e.g. 122): The conditions assumed by the two models overlap, and both models lead to some of the same predictions (e.g. that day to day variance in food intake will be reduced).

REDISTRIBUTION   Societies with redistribution present important opportunities to study how people with power manage and manipulate economic and political systems. Betzig (19) studied redistribution of collectively caught fish on Ifaluk, a Micronesian atoll with several chiefs. In addition to a variety of other perquisites, Ifalukese chiefs obtain almost twice as much fish per person for their households from each collective catch as do other men, and they spend significantly less time working than do other men of the same age group. Chiefs also collect food regularly from distantly related households and redistribute it to more closely related ones. Although the group may benefit in some ways from the system (e.g. collective fishing is more productive than individual fishing even if chiefs do skim the fat off the catches), the Ifalukese system of redistribution is clearly inegalitarian, with the bulk of the benefits accruing to the chiefs and their close relatives.

REPRODUCTIVE EFFORT

Direct Reproduction

MATING EFFORT   The behavioral ecological study of human mating patterns has shed light on many classic topics in sociocultural and biological anthropology (for recent reviews, see 17, 34, 88, 119). Topics covered here include the causes of polygyny and polyandry, variations in marriage transactions, and sociocultural change. Space limitations preclude a discussion of other important topics, including monogamy (21), divorce (20), physical sexual dimorphism (e.g. 85), sex differences in mate preferences and sexual behavior (39, 71a), and sex differences in spatial ability (156).

Mating systems and mate choice   Mating systems are the outcome of interactions between male and female strategies. Studies of mating systems have tended to emphasize either female strategies for selecting males or male strategies for attracting females. Among humans, kin of the bride and groom also often have a great deal of influence on mate choice, and their influence on mating decisions is a little-explored but important area for new research.

The mating strategies of human males can sometimes produce spectacular results. For example, despotic rulers have routinely accumulated large harems and possessed extraordinary rights of sexual access to subject females (16). In politically less centralized societies force also is sometimes a factor in male mating success (e.g. 49, 78; see also 60, 168), but other factors such as manipulation of kin networks (48), hunting skill (112), religious status (140), and especially resource accumulation (30, 57, 116) are more frequently identified as the key variables. Even kinship terms can be the subject of male mating strategies. Yanomamö males have been shown to manipulate their Iroquois kinship terminology in an effort to obtain more mating opportunities, frequently moving women from nonmarriageable categories like "sister" and "niece" to the marriageable category of cross-cousin (i.e. cousins linked by a brother and sister rather than by siblings of the same sex)(50).

Females may choose among males according to a variety of variables, including the resources they control. According to the polygyny threshold model (145), polygyny may result if males vary in terms of the resources they control enough to allow a female to raise as many or more offspring by mating with already mated males with high quality resources than with bachelors with poor resources. This helps explain polygyny among Kipsigis women, who prefer men who can offer them access to more land, even when controlling for the man's marital status and his overall wealth (33; see also 183).

Variations in male control of resources may also help to explain polyandry. Among Tibetans, fraternal polyandry offers a way to deal with a shortage of arable land and a lack of economic options. The peasants of the Ladakh region can farm only in small fertile areas, and subdividing their estates to provide each son with a separate inheritance would lead to many small, nonviable farms. In some societies, this problem has been handled with rules of primogeniture or ultimogeniture, but the Ladakhis developed instead a system of fraternal polyandry. Although polyandrous Tibetan families are highly fertile, younger brothers may suffer reproductively from the arrangement since they often do not reach sexual maturity until the wife they share is well into her reproductive career, and they often opt for monogamy over polyandry when economic development makes it possible (58).

Human females may also choose males based on their apparent resistance to pathogens, an idea supported by a cross-cultural correlation between degree of polygyny and pathogen stress (94, 134). Though intriguing, this can be further tested only with detailed studies of marital success, pathogen stress, and mate selection in individual societies. Furthermore, because resources, pathogen resistance, and other variables might influence mate choice simultaneously, more studies are needed that measure the relative importance of such factors in specific societies.

The models discussed above may be inadequate with respect to many

human societies owing to the influence of kin on marriage decisions. The preferences of kin are often expressed in the form of prohibitions, pre- scriptions, and preferences about sexual and marriage partners, including incest taboos (see 167) and cousin marriage preferences (47, 76; see also 65, 118). Even where marriage rules are few and marriages not arranged, kin can have important influences on mating decisions. For example, male Trinida- dian villagers have high rates of agonistic interactions with their daughters and their potential suitors. Such daughter guarding seems to help ensure the daughter's reputation of chastity, allaying suitors' fears of cuckoldry and helping the daughter to attract and retain a more desirable male. Young women with resident fathers are more than four times as likely to establish stable marriages with prosperous males than are young women without resident fathers (79). Because kin influences on mating decisions are crucial to understanding human mating patterns, they should have a high priority for future research, particularly in situations with clear conflicts of interest between the marriage partners and their kin.

Marriage transactions   Behavioral ecologists have examined several types of marriage transactions, including direct exchange, bridewealth, and dowry. A first step toward an analysis of direct exchange is Chagnon's (47, 48) work on how Yanomamö descent groups act as coalitions of related males, assisting one another in mate competition, with pairs of lineages building up reciprocal obligations to exchange mates (see also 118). This raises a number of questions for future research. Is there an optimum lineage size for the mating success of lineage members? What are the reproductive costs and benefits involved in the founding of new lineages? How are long-term exchange relationships between lineages begun and managed? Game theoretical models (see below) should prove useful in guiding research on such questions.

Borgerhoff Mulder (31) hypothesized that variations in bridewealth pay- ments among the Kipsigis might be explained by the bride's reproductive value, the value of her labor, and the relative status of the families involved. Reproductive value was estimated by examining age at first menses, which correlates with lifetime reproductive success among Kipsigis women, and women's plumpness. The brides' labor value was estimated by dividing women into those who would and those who would not be living close enough to their natal homes after marriage to allow them to continue to contribute labor. Relative family status was estimated by means of wealth holdings. Borgerhoff Mulder's analysis showed that both reproductive value and labor had measurable effects on bridewealth payments, with higher bridewealths being paid for earlier-maturing, plumper brides and for brides moving far from their natal households. The unimportance of relative family status may be due to the instability of wealth differentials among the Kipsigis. Dowry,

much less common than bridewealth, tends to appear among the upper levels of stratified societies. Gaulin & Boster (86; see also 65) conducted a successful holocultural test of the hypothesis that dowry is a mating strategy used by brides and their kin to attract the wealthiest bridegrooms in stratified societies.

Mating strategies and sociocultural change   Adaptive changes in mating strategies may help explain sociocultural change. For example, the Mukogodo of Kenya underwent a rapid shift from foraging to pastoralism early in this century as a result of changes in their regional marriage system. Before the 1920s, they lived in caves as foragers, spoke a unique language, married only among themselves, and paid beehives as bridewealth. Changes wrought by British colonization sparked a rapid increase in the rate of intermarriage between the Mukogodo and several groups of Maasai-speaking pastoralists; but, because the Mukogodo had few livestock and the Maasai-speakers would not accept beehives as bridewealth, many more of their women married men from other groups than vice versa. Mukogodo men were under pressure either to become pastoralists or to risk reproductive failure, and their difficulties are reflected in a high rate of wifelessness: Among men who began looking for mates during the transition, about one third never married. The result was a rapid shift not only in subsistence patterns but also in language, religion, territorial organization, and social relations (54).

   Cultural change also appears to enhance reproductive success among the Shipibo Indians of the Peruvian Amazon (106). Monogamy is becoming more common than polygyny among the Shipibo. As a result of shorter postpartum sexual abstinence and shorter interbirth intervals, women married monogamously have higher fertility than those married polygynously. Is monogamy therefore a reproductive strategy for the Shipibo, or is it just a reproductively fortuitous but unplanned result of culture change? What was discouraging monogamy before missionization? Pre-contact polygyny may have been due to variations among males in such favorable characteristics as pathogen resistance or economic success, or the Shipibo environment may have been changed in a crucial way by the increased availability of modern medicine or by economic development. Polygyny is associated with long interbirth intervals and lower child and maternal mortality. Before the introduction of modern medicines, monogamy may have been a worse strategy than polygyny since it could have increased child and maternal mortality. This idea remains to be tested, but it may be that the Shipibo are shifting reproductive strategies as their epidemiological environment changes.

PARENTAL EFFORT   Major areas of research discussed here are sex-biased parental investment, inheritance practices, paternal behavior, and parent-offspring conflict. Other notable topics include acculturation practices (132)

and adopting out as a parental strategy (18; for reviews, see 17, 34, 35, 88, 119).

Sex-biased parental investment   Sex biases in parental solicitude, child abuse and neglect, and infanticide are well documented among both humans and nonhumans (e.g. 100 and below). The Trivers-Willard model is an often used explanation of this phenomenon (173). In its broadest formulation, the Trivers-Willard model predicts that if the condition of mothers during the period of parental investment correlates with the probable reproductive success of their offspring, natural selection should favor the ability of parents to adjust their investment in the sexes to favor the sex with the best reproductive prospects. More specifically, Trivers and Willard predicted that, when the reproductive success of males is more variable than that of females and males benefit more than females from good maternal condition and suffer more than females from poor maternal condition, males should be favored by mothers in good condition and females by mothers in poor condition. Among humans, Trivers and Willard suggested that socioeconomic status may be a good predictor of parental investment patterns if reproductive success of males is greater than that of females at the upper end of the hierarchy and lower than that of females at the lower end (see 88, 154).

The Trivers-Willard model has been used to explain biased sex ratios and parental investment patterns in a wide variety of historical and ethnographic settings (24, 29, 55, 56, 64, 141, 180). The focus of most of these studies is male bias among high-status groups. Voland (180), for example, found that in Schleswig-Holstein between 1720 and 1869 the reproductive prospects of males correlated with socioeconomic status, but those of females remained constant. High-status farmers appear to have responded to this by favoring their sons over their daughters. In the highest class, infant mortality was higher among females, while it was lower among females in all other classes (but see 154). The poor, low-status Mukogodo also fulfill the predictions of the Trivers-Willard model. Owing to their low status, Mukogodo males have poor reproductive prospects, but Mukogodo females have no trouble finding husbands and often marry hypergynously; and Mukogodo parents raise more daughters than sons. The sex ratio bias is probably produced after birth through better treatment of daughters, judging from visits to health facilities and nursing patterns (55).

Data from the Krummhörn region of Germany in the 18th and 19th centuries provide an enlightening contrast with those from Schleswig-Holstein and the Mukogodo. In the Krummhörn, infant mortality rates suggest that high-status families biased their investment in favor of daughters, a pattern that corresponds with the relative reproductive prospects of sons and daughters. Due to land scarcity, only the youngest son of a farmer inherited

any land, and as a result sons of landed farmers were more likely to remain lifelong celibates than those of the landless. The daughters of landed farmers, however, were more likely to marry than those of the landless (184) . A much needed complement to the studies mentioned here would be analyses of the proximate psychological mechanisms involved in sex-biased parental behavior, which would clarify the circumstances surrounding the evolution of such behavior and the reasons why particular models seem to work in some cases but not in others.

Inheritance patterns   Sex biases are also common in inheritance practices, with inheritance by males being the most common pattern. Hartung (96) hypothesized that in polygynous societies sons are often favored over daughters in inheritance because they stand to benefit more reproductively from wealth than do their sisters. The males' advantage results from their ability to marry polygynously. Hartung's idea is supported by strong cross-cultural correlations between polygyny and male-biased inheritance (98). At first glance, the Kipsigis appear to fit Hartung's model: They are polygynous, pay bridewealth, and allow only sons to inherit land and livestock. However, Borgerhoff Mulder (32) has shown that although sons do benefit reproductively more than daughters from their parents' ownership of cattle, both sons and daughters benefit from parental land ownership, raising the question of why the Kipsigis do not pass land on to both daughters and sons. One problem is that land inheritance by daughters would lead to the breakup of the patrilineal corporate landowning group and also conflict with their custom of virilocal postmarital residence. Kipsigis parents also have other ways of benefiting their daughters, such as through gifts of food and through marriage negotiations. Cultural inertia may be involved. Until the 1930s, the Kipsigis held land communally, and only livestock were inherited. While it was simple to extend the sons-only inheritance rule to land, the idea of allowing daughters to inherit land seems preposterous to Kipsigis parents. Recently, however, some Kipsigis have begun to give or sell land to their matrilocally resident sons-in-law, allowing them to maintain a male-biased façade while giving their daughters access to additional real property (T. MacMillan, personal communication).

Another influence on inheritance patterns may be paternity certainty. In societies where paternity certainty tends to be low, a typical man's genetically closest kin in the next generation are likely to be his sisters' children rather than his wife's. The idea that this might help explain matriliny and the avunculate has existed for centuries. The Arab chronicler al-Bakri, for example, writing in the 11th century, noted that the throne of ancient Ghana was inherited by the king's sister's son because the king "has no doubt that his successor is a son of his sister, while he is not certain that his son is in fact his

own" (1, p. 79). Cross-cultural tests (76, 87, 97, 99; see also 88) of this idea have had mixed results and are beset by methodological and theoretical problems. Society-wide levels of paternity certainty are difficult to measure with the existing cross-cultural databases, and their meanings are difficult to interpret. Furthermore, rarely does a society have the extremely low level of paternity certainty necessary to make any man's sisters' children his genetically closest descendants (see 88). This model also does not address the causes of variations in paternity certainty. In an effort to get around some of these problems, Hartung (99) has examined matrilineality as a female inheritance strategy, pointing out that matrilineal inheritance is to females' advantage whenever paternity is at all in doubt because anything inherited through males may be wasted owing to cuckoldry. All these models leave open the question of how conflicts of interest among kin over inheritance patterns are settled, a question that may best be answered through the use of game theoretical models and detailed studies in specific societies.

Paternal behavior   Despite the importance of male parental investment among humans, few detailed studies exist of paternal behavior in traditional societies. Hewlett's (108) work among the Aka pygmies of central Africa is a notable exception. He found that lower-status Aka men with few resources to offer their wives and children compensated by spending more time in direct child care than higher-status men, suggesting that even in simple, superficially homogenous societies individuals can be expected to follow a variety of different reproductive strategies (see also 107, 112, 148).

Parent-offspring conflict   Although the reproductive interests of parents and offspring overlap greatly, they also may conflict (172). Flinn (80) has documented such reproductive conflict between mothers and daughters in a Trinidadian village (see also 175). Because both mothers and daughters benefit from help from co-resident nonreproductive females, when both are potentially reproductive, both should want to reproduce directly and receive undivided help from the other. The rate of agonistic interactions between daughters and their parents and daughters' reproductive rates reflect this conflict: Daughters aged 14–25 with reproductive mothers experienced more such interactions and lower fertility than daughters with nonreproductive mothers. It is unclear exactly how daughters' fertility is suppressed, but the possibility that it is the result of stress induced by agonistic interactions should be explored, perhaps by using salivary steroids to assess stress levels and ovarian function. Many other opportunities exist for studies of parent-offspring conflict. Gerontocratic societies offer especially clear opportunities to study reproductive conflicts between fathers and sons.

Indirect reproduction   Because related individuals share genes with their codescendant kin, they can reproduce not only directly but also indirectly by helping their kin to reproduce (93). Selection will favor such behavior when the costs to the actor in terms of reproduction are less than the benefits to the recipient, devalued by the coefficient of relatedness (e.g. 0.5 for full siblings and 0.125 for first cousins), an inequality known as Hamilton's rule. Hamilton's theory of indirect reproduction is also known as kin selection, inclusive fitness theory, and nepotism theory. Many studies have demonstrated that humans are generally nepotistic—i.e. that they tend to help others in accordance with genetic relatedness (e.g. 9, 23, 48, 60, 74, 89, 101, 112, 115, 155; see 34, 88, 95, 119), but full tests of the theory require measurements of the reproductive costs and benefits involved in helping behaviors as well. Steps toward this goal have been taken by Flinn (80; see above), Berté (15), and Turke (175). Berté (15) showed that success of maize cultivation among the K'ekchi' Maya depends on household heads' abilities to secure the aid of locally resident genealogical kin. Men with more such kin had higher crop yields, and household heads who were highly related to the local pool of potential laborers had higher reproductive success. Turke (175) demonstrated the reproductive benefits of aid to kin in a study of daughters and grandparents as helpers at the nest on Ifaluk. Ifalukese women who bear daughters first have higher reproductive success than those who bear sons first, and individuals' reproductive success correlates with their numbers of living parents. Daughters, however, pay a price in that their reproductive success correlates negatively with their numbers of siblings. The question of whether daughters are compensated for their loss of direct reproduction by an increase in indirect reproduction remains to be answered.

Hamilton's theory may also be applied to situations where aid to consanguineal kin is channeled through intermediaries, such as affinal kin, which may help to explain the importance of aid among affines in many societies (67, 114). Although affines do not share genes by common descent, they share a genetic stake in their common descendants and should therefore be expected to cooperate. Dow (67) has quantified such relationships and reanalyzed Hawkes's (101) data on gardening aid among the Binumarien of New Guinea. Further development of this idea may eventually provide a useful extension of Hamilton's rule.

LIFE HISTORY STRATEGIES

Most studies discussed above focus on one goal at a time, be it food acquisition, mate acquisition, or the allocation of aid, but in reality individuals must try to achieve several different and often conflicting goals at

once. Life history strategies are the ways that individuals allocate effort among various goals at different times in their lives. Although life history theory is well developed (see 3, 35), the empirical study of human life history strategies has just begun. Research on three key events in the life histories of human females are examined here: menarche, menopause, and death.

Menarche signals a shift of effort from somatic to reproductive goals. Natural selection, ceteris paribus, favors organisms that begin reproducing as early as possible, because there is always some risk of death before reproduction. However, competition between the still-growing mother and fetus over nutrients or the small size of the birth canal in young mothers may select against too early attempts at reproduction (35). Natural selection for menarcheal age should produce a correlation between modal age at menarche and reproductive success. Such a correlation has never been sought, but associations between low reproductive success and both early and late age at menarche (35) suggest that such a test would be successful. We may also find delays in menarche where the costs of delays in age at first birth are offset by opportunities for indirect reproduction. This hypothesis would be supported if early-birth-order daughters were found to mature later and spend more time helping to raise their siblings than late-birth-order daughters.

At menopause, effort shifts away from direct reproduction. Because there is little reason for women to shift effort so late in life toward somatic effort, they should instead be expected to concentrate on indirect reproduction, an emphasis documented among the Hadza foragers of Tanzania (105) and elsewhere (e.g. 115a, 175). Postmenopausal Hadza women spend more time in food acquisition than younger women, allowing their adult daughters to focus on parental effort. This may explain the evolution of menopause: Older females may enhance their fitness more effectively by helping their daughters to reproduce than by attempting additional risky pregnancies themselves.

The timing of death—the cessation of all effort—may also be a product of natural selection. This idea finds support in data from 18th century Ostfriesland, where women who gave birth for the last time earlier tended also to die earlier than women who completed their direct reproductive careers later (182). The explanation may have been that when a woman's last child married, one evolutionary reason for her continued existence—to help her children develop and find good mates—was lost. A more complete test of this hypothesis would include evidence that mothers' activities before their children's marriages had important effects on the children's reproductive success, that postreproductive mothers had few opportunities for indirect reproduction, and that the correlation between women's ages at the end of their reproductive careers and at death is not the result of some third factor, such as variations in health.

GAME THEORETICAL APPROACHES TO SOCIAL INTERACTIONS

Most of the models described above assume that an actor's environment is not greatly affected by his own behavior, but when an actor's environment consists of other actors whose behaviors may change in response to the actor's behavior, game theoretical models are more appropriate. Because strategies that are optimal for one player in a game may not be feasible owing to the actions of other players, the researcher's goal is instead to identify the most stable strategies. Such evolutionarily stable strategies (ESSs) are those that, if adopted by most members of a population, do as well or better than all of the available alternative strategies (see 103, 146). Mixed ESSs, in which multiple strategies are stable in certain proportions within the population, can also develop.

A game theoretical model was used by Smith (159) to analyze how conflicts of interest between would-be group joiners and current group members influenced sizes of Inuit hunting groups. Joiners face a trade-off between their individual returns if they forage alone and their returns if they join a group of size n - 1, becoming its nth member. Members, on the other hand, face a trade-off between their individual returns if the group size remains at n - 1 and their returns if they agree to add an nth member. A conflict of interest will arise whenever the joiner does better by joining the group than by foraging alone but the current members would be better off without him. Some observed Inuit hunting group sizes seem to reflect this conflict. For example, although individual returns from seal-breathing-hole hunting are optimal with group sizes of three, modal group size is four and the maximum observed is eight, suggesting that joiners are often successful in pushing groups beyond optimal size. Although this model is heuristically useful, it lacks the ability to predict how conflicts between joiners and members are likely to be resolved. Other game theoretical models have been applied to cooperation (5), lineage exogamy (118), resource sharing and land tenure (160, 161), and contests over resources (25; also see above).

Game theory may also shed light on the foraging decisions of Ache men (102). Although Ache men could maximize their rate of food acquisition by collecting palm starch, which is consumed mainly within families (122), they instead choose the riskier strategy of acquiring meat, which is shared throughout the band with no advantage to the hunter or his family. By focusing his effort on meat rather than palm starch, an Ache man lowers his overall rate of return and provides his own nuclear family with fewer calories, but he is occasionally able to provide the band with large amounts of food. Hawkes (102) suggests that the high-risk "showoff" strategy of hunting may have

greater reproductive benefits for men than the low-risk "provisioner" strategy of palm starch collection. The parameters of Hawkes's model are the various costs and benefits involved in the two strategies. Showoffs receive reproductive benefits in two forms: greater tolerance by band members of their extramarital affairs, resulting in more offspring born, and greater solicitude by band members towards the children of good hunters, resulting in higher offspring survivorship (112). The cost to a showoff is the reduction in his wife's potential reproductive success due to his failure to provide her with a steady supply of palm starch. Provisioners are posited to increase their reproductive success by reliably supplying their families with food, but they lose reproductive success to the extent that their wives' children are actually fathered by showoffs. Hawkes calculates that showing off is a stable strategy for most values of the model's parameters, including those estimated for the Ache. This model raises important questions for the study of the sexual division of labor and household economics because it is not based on the usual assumption that married couples perform complementary tasks for their mutual benefit.

Game theoretical models may also provide insights into the development of moral rules and cultural norms. Moral rules may develop where one's reputation affects one's ability to attract allies (3, 37, 119). Giving low-cost aid, even to those who do not reciprocate, may be a form of reputation management. Other rules and norms, even quite arbitrary ones, could spread in a similar way as long as people punish both rule-breakers and those who fail to punish rule-breakers (38, 138). Empirical tests of such models will be challenging but potentially very productive and rewarding (95).

CURRENT ISSUES AND FUTURE DIRECTIONS

Vertically Integrated Explanations

The focus of most of the studies described above on the ultimate level of causation, while necessary and important, is necessarily incomplete. Full explanations of behavioral phenomena would integrate analyses at the ultimate level with those at the proximate, ontogenetic, and phylogenetic levels (9). Progress is being made toward this goal on two main fronts: evolutionary psychological anthropology and reproductive ecology.

The development of evolutionary psychological anthropology is being stimulated by the growth of both evolutionary psychology and evolutionary anthropology. The need for such a hybridization has been made clear by a recent debate between those who emphasize the study of the current adaptive value of behaviors (see 177) and those who study the proximate psychological mechanisms behind behaviors (9, 10, 169, 165). Each side in the debate is incomplete without the other: Studies of the adaptive significance of be-

haviors are necessary as guides to the proximate mechanisms we can expect natural selection to have favored in our evolutionary past, but they are incomplete without an understanding of the proximate mechanisms involved.

Evolutionary psychological anthropology will be able to build not only on the research described above, but also on a large evolutionary psychological literature on a variety of theoretical, methodological, and clinical problems. These include cognition (53), development (14, 52, 136), personality (see 40), mating strategies (e.g. 39), sexual fantasies (71a), social learning (28, 193), emotions (143), psychoanalysis and psychotherapy (e.g. 6), suicide (63), self-deception (130), aggression (60), rape (168), autism (147), and anxiety (174).

Some of the topics already explored by evolutionary psychologists among traditional non-Western peoples include the decision-making processes of foragers (142; see also 11), the evolutionary psychology of development among Navajo infants (52), the effects of father absence and family structure on reproductive strategies (69), the effects of people's perceptions of resource availability in African mating systems (68), emotional experiences and autonomic nervous system activity among the Minangkabau (70a), and mate preferences in a variety of societies (39). So far, however, such studies have done little more than add data on the mechanisms behind the behavior of non-Western peoples to that on the behavior of Westerners. Vertically integrated explanations require something more: simultaneous analyses of the fitness consequences of behavioral patterns and of the proximate mechanisms behind those behaviors.

The proximate links between environments, behavior, and the physiology of human reproduction are being examined under the heading of reproductive ecology (72, 191). Reproductive ecological research on the energetics of ovarian function have already proved essential to the study of such behavioral and cultural patterns as bridewealth (31) and birth spacing (27), and elucidation of other connections among reproductive physiology, behavior, and evolution can be expected soon.

Cultural Transmission, Social Learning, and Social Manipulation

It has often been argued that a fruitful analogy can be drawn between the evolution of genetically and that of culturally transmitted information. The most promising cultural transmission (or dual inheritance) models (e.g. 36) focus on interactions between the genetic and cultural tranmission of information. An analogy between genes and investors best explains the logic behind this approach (149).

An investor can either issue one set of rigid instructions for his broker to follow or allow his broker to make decisions independently about his port-

folio. Rigid instructions insure that only the needs of the investor will be considered in investment decisions, but if the market is unpredictable and information expensive, it may be unsuccessful. Because the broker has access to a great deal of information, the investor may be better off with the second strategy. However, brokers have interests of their own and may trade a client's stock to generate commissions rather than to enhance the value of the client's portfolio. For most investors, an intermediate strategy is probably optimal. Similarly, the interests of genes may or may not be served by culture. Culture allows individuals to acquire information rapidly, which, especially in an unpredictable environment, can be very adaptive. However, since culture is, like genes, a system of inheritance, it can develop its own set of reproductive interests: Behaviors that enhance the reproduction of cultural traits may not always do the same for genetic traits. An intermediate strategy is probably optimal for genes as well as for investors: Allow information to be transmitted culturally as well as genetically, but do not allow culture free reign over behavior. In short, humans should have mechanisms of social learning that help them distinguish among culturally transmitted behavioral options in terms of how they affect the survival and reproduction of their genes.

The usefulness of this approach could best be demonstrated in situations in which culture seems to lead people to behave maladaptively. The most notable and ambitious attempt thus far at such a test is Flannery et al's (75) study of herd management in Ayacucho, Peru. The authors argue that evolutionary biological theory cannot explain the behavior of herd owners, who sometimes share llamas with nonrelatives; Flannery et al offer an alternate explanation based on a model of dual inheritance (36). Although their use of both evolutionary biological and dual inheritance theories is encouraging, Flannery et al's study is flawed by misunderstandings of both evolutionary biological and dual inheritance theories and by inadequate attention to alternate evolutionary biological explanations of gift-giving. For example, reputation management (3; see also above) might play a role.

Critics argue that cultural transmission theory is based on a weak analogy and that at least some of its versions may encourage the treatment of individuals as passive recipients of culture; the theory may thereby discourage inquiry into individuals' self-interested, strategic behavior and lead to a reinvention of the superorganic notion of culture (59, 81, 82). Indeed, the popularity of cultural transmission or dual inheritance models seems partly attributable to the widespread but mistaken idea that they justify the study of human behavior without attention to biology.

Research on cultural transmission is likely to be most fruitful if it is securely linked to the psychological study of evolved mechanisms of social learning (36, 81; see also 28, 163, 193). It is ironic that it should be necessary

to re-establish such an approach since at one time psychological anthropologists were the foremost proponents of the study of the cultural transmission of information (84). Special attention should be paid to the role of culture in social manipulation. Culture is part of the extended phenotype (61) of humans; communication can be seen as an attempt not simply to inform others, but also to manipulate their behavior (95, 120, 126). Although an analogy is often drawn between cultural traits and viruses, a better analogy might be between culture and biological warfare: Culture is manipulated and spread by people in order to influence the behavior of others, and it should encourage the development of defense mechanisms.

The idea of culture as a manipulative tool has important implications for future research. First, care must be taken in data collection to distinguish between actual behavioral patterns and informants' statements about them; these phenomena are too often naively assumed to correspond (56, 95). The response of some researchers to this problem has been to all but ignore informants' statements and to rely instead upon such useful but limited techniques as observational scans. A more interesting approach is to study informants' statements themselves as behaviors, intended to manipulate other people. For example, as mentioned above, male Yanomamö manipulate the terms they use for their female kin to gain reproductive advantage (50); men in the New Guinea Highlands loudly proclaim their hostility toward women, possibly in an attempt to influence the behavior of their reproductive competitors (95). Such an approach might also encourage reinterpretations of the many cross-cultural tests of evolutionary biological hypotheses that have used normative statements as proxies for actual behavioral patterns.

Other Directions for Future Research

Use is being made of evolutionary biological theory in many other fields, including legal theory (12), political science (5, 16, 137), aesthetics (66, 71), semiotics (150), demography (152, 176, 179), sociology (131), and the study of ethics and morality (3, 119). Because each of these areas is of concern to anthropology, researchers in all of the discipline's subfields and specialties stand to benefit from the ongoing expansion of the use of evolutionary biological theory in the behavioral and social sciences and humanities.

CONCLUSION

Human behavioral ecology is being pursued on a wide range of fronts by a diverse group of researchers. Although the approach is young and controversial, it has accomplished much, and anthropologists have begun to appreciate its usefulness (e.g. 129). The future of human behavioral ecology

will be determined in large part by its ability to justify the continued and expanded appreciation of the scholarly community.

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The Environment in Anthropology

A Reader in Ecology, Culture, and Sustainable Living

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Contents

Acknowledgments

General Introduction to the Reader

Today, environmental problems threaten not only natural ecological qualities but also humanity's very existence. This collection of readings demonstrates the importance of anthropological theory and practice for solving environmental problems. In making selections from a large body of excellent work, we searched for highly readable articles that touch on the breadth of environmental issues that anthropologists work on. Our search found that today's anthropology of the environment is changing rapidly. Anthropologists are deploying new research methods, new interdisciplinary collaborations, and new theories to make sense of environmental problems and people's responses to them. Given these innovations and the growing size of the literature, no reader can offer more than a sample. The readings we have chosen address what we see as the key environmental questions of the 21st century. These include population growth, economic development and underdevelopment, biodiversity loss, environmental management, the future of indigenous groups, and the link between consumption and globalization. In order to tackle these questions, we offer a mix of practical case studies, theoretical debate, and discussion of moral and ethical issues.

The first section presents an overview and background of today's anthropological approaches to the environment. Students will find that many of the ideas in this section reappear, sometimes in new guises, in later contributions. Discussions of theory continue in the following sections, each of which includes one chapter authored by a prominent theorist. The sections then include examples of academic and popular reporting of cases and issues, followed by a polemical piece offering a contrarian position, and a paper that gives an ethical reflection.

Investigative pieces offer broad descriptions of environmental problems, often using aggregate statistics. Case studies of current research and action focus attention on the specific ways people are working through, or failing to address, environmental problems. The polemical pieces present opposing information to challenge other contributions, to spark discussion, and provide critical perspective. Finally, ethical discussions demonstrate that all environmental issues rest on larger questions of social justice, humanity's place in the world, and fundamental ideas about what it means to be human. We hope students will use the ethical arguments to reflect on the moral underpinnings of their own approach to environmental issues.

In order to fit so much material into an affordable reader, we have abridged the original publications by as much as one-third. We sought to retain coherence in the authors' original argumentation and maintain a narrative flow. We encourage readers,

intrigued by a particular selection, to return to the paper's complete version to gain a better sense of the argument and content.

The reader as a whole demonstrates three themes which link the topical sections. The first is the diversity of approaches to understanding environmental problems. People throughout the world face environmental crises. However, environmental issues are perceived differently by people of distinct genders, social classes, and cultural orientations. People disagree about the content of problems and what they mean to the groups affected by them. These disagreements deeply affect the ways environmental problems are solved and by whom.

A second theme is the need for creative inquiry that finds possibilities within the limits of different knowledge structures. If no single approach is a cure-all for environmental problems, then we might question how far any theory or method can take us in understanding and resolving a situation. We may find that a theory which helps in explanation is less useful in the development of practical solutions. We may find a need for multiple explanatory theories. In any case, rather than view the diversity of environmental problems and proposed solutions as leading to a stalemate, students of anthropology will find themselves uniquely positioned to develop creative intellectual and practical responses to this diversity.

The third theme is the importance of personal action in the face of environmental problems. Students in the United States are often most familiar with environmental activism centered on recycling, litter removal, and rain forest protection. Some authors here point to the need for broader forms of activism, and they make clear suggestions for change. Other authors propose or imply the need for political solutions. Transparently or not, an author's ethical position always informs her or his writing. The readings on morality and ethics should help students link moral positions to the solutions proposed by other authors. Formulating an effective personal response to environmental problems is difficult, especially as solutions are often depicted as an onerous number of small tasks ("100 Things You Can Do to Save the Environment"). These moral and ethical discussions may help students get beyond the dizzying number of environmental problems and solutions. A belief *system* puts this mixture in perspective by allowing for systematic comparison of specific issues and problems.

We believe that a combination of theory, empirical research, and ethical debate may offer the most powerful anthropological response to environmental problems. In this sense, we hope these readings serve as tools for students whose concern for ecological issues pushes them beyond cursory analyses to a more comprehensive approach.

Theoretical Foundations

This section establishes some foundations for studying human-environment issues in anthropology. Questions of how people modify, symbolize, and adapt to their immediate surroundings have intrigued anthropologists since the discipline's earliest days. Recognizing the importance of early 20th-century work, we begin here with Julian Steward's work dating from the 1950s, because his ideas have had such an enduring effect on anthropological approaches to the environment. This selection provides the outline of Steward's idea of a "culture core," those cultural features which articulate most closely with a specific environment.

Steward's writing builds on previous debates regarding environmental determinism and "possibilism." Respectively, determinism and possibilism examined whether environmental features determined or simply made possible cultural formations. By the 1950s, most anthropologists subscribed to this latter approach. Nonetheless, determinist ideas persist as researchers explore the extent to which ecologies are malleable and the extent to which people must adapt to the demands of their immediate environment. Anthropologists, thus, often focus on the creativity involved in developing adaptive systems of exploitation. Past textbooks, for example, focused on a series of adaptations to particular environments (Netting 1986).

Contributions by Emilio Moran and Robert Netting offer two ways to think about ecosystems and adaptation, two of the key terms cultural ecologists borrowed from biology. Moran describes how anthropologists borrowed the ecosystem concept from the physical sciences to assess human populations as a single element within a larger ecological setting. Practitioners working within this framework evaluated human impacts by measuring energy flows, or the transformation of solar energy into plant material, which in turn interacts with a web of animal life. This interest in energy harkens back to the work of Leslie White, discussed in Section Three, although ecosystem approaches differ from White's by using a different definition of energy. Netting's understanding of energy, for example, makes sense in light of his broader and more flexible idea of the ecosystem. Netting focuses on adaptation as a process of environmental management in which people use skill and experience in creative ways. Netting introduces ideas of sustainability to the collection and expands notions of adaptation to include not only adaptation to a physical environment but also to broader economic systems.

Anthropologists have more recently expanded beyond a focus on local communities to emphasize these broader political and economic contexts. Contributions by Conrad Kottak, Virginia Nazarea, and Dianne Rocheleau, Barbara Thomas-Slayter,

and Esther Wangari reflect on and trace these changes. All these authors call for continued changes in the objects of anthropological research, as well as the theories that frame human-environment inquiries. They want to focus attention on power structures, discourses, and identities in ecological settings. Yet, these authors never set aside the question of adaptation, a broader comparative and historical perspective, and, ultimately, the quality of human-environment interactions.

This section's ethical discussion is by I.G. Simmons, who defines "environmental ethics." Simmons then outlines the history of two major ethical positions and their current manifestations. Simmons establishes a vocabulary that appears in later selections and one with which students may begin to articulate their own ethical standpoints.

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The Concept and Method of Cultural Ecology

Julian Steward

Cultural Ecology

Cultural ecology differs from human and social ecology in seeking to explain the origin of particular cultural features and patterns which characterize different areas rather than to derive general principles applicable to any cultural-environmental situation. It differs from the relativistic and neo-evolutionist conceptions of culture history in that it introduces the local environment as the extracultural factor in the fruitless assumption that culture comes from culture. Thus, cultural ecology presents both a problem and a method. The problem is to ascertain whether the adjustments of human societies to their environments require particular modes of behavior or whether they permit latitude for a certain range of possible behavior patterns. Phrased in this way, the problem also distinguishes cultural ecology from "environmental determinism" and its related theory "economic determinism" which are generally understood to contain their conclusions within the problem.

The problem of cultural ecology must be further qualified, however, through use of a supplementary conception of culture. According to the holistic view, all aspects of culture are functionally interdependent upon one another. The degree and kind of interdependency, however, are not the same with all features. Elsewhere, I have offered the concept of *cultural core*—the constellation of features which are most closely related to subsistence activities and economic arrangements. The core includes such social, political, and religious patterns as are empirically determined to be closely connected with these arrangements. Innumerable other features may have great potential variability because they are less strongly tied to the core. These latter, or secondary features, are determined to a greater extent by purely cultural-historical factors—by random innovations or by diffusion—and they give the appearance of outward distinctiveness to cultures with similar cores. Cultural ecology pays primary attention to those features which empirical analysis shows to be most closely involved in the utilization of environment in culturally prescribed ways.

The expression "culturally prescribed ways" must be taken with caution, for its anthropological usage is frequently "loaded." The normative concept, which views culture as a system of mutually reinforcing practices backed by a set of attitudes and values, seems to regard all human behavior as so completely determined by culture that environmental adaptations have no effect. It considers that the entire pattern of technology, land use, land tenure, and social features derive entirely from culture. Classical illustrations of the primacy of cultural attitudes over common sense are that the Chinese do not drink milk nor the Eskimo eat seals in summer.

Cultures do, of course, tend to perpetuate themselves, and change may be slow for such reasons as those cited. But over the millenia cultures in different environments have changed tremendously, and these changes are basically traceable to new adaptations required by changing technology and productive arrangements. Despite occasional cultural barriers, the useful arts have spread extremely widely, and the instances in which they have not been accepted because of pre-existing cultural patterns are insignificant. In pre-agricultural times, which comprised perhaps 99 percent of cultural history, technical devices for hunting, gathering, and fishing seem to have diffused largely to the limits of their usefulness. Clubs, spears, traps, bows, fire, containers, nets, and many other cultural features spread across many areas, and some of them throughout the world. Later, domesticated plants and animals also spread very rapidly within their environmental limits, being stopped only by formidable ocean barriers.

Whether or not new technologies are valuable is, however, a function of the society's cultural level as well as of environmental potentials. All pre-agricultural societies found hunting and gathering techniques useful. Within the geographical limits of herding and farming, these techniques were adopted. More advanced techniques, such as metallurgy, were acceptable only if certain pre-conditions, such as stable population, leisure time, and internal specialization were present. These conditions could develop only from the cultural ecological adaptations of an agricultural society.

The concept of cultural ecology, however, is less concerned with the origin and diffusion of technologies than with the fact that they may be used differently and entail different social arrangements in each environment. The environment is not only permissive or prohibitive with respect to these technologies, but special local features may require social adaptations which have far-reaching consequences. Thus, societies equipped with bows, spears, surrounds, chutes, brush-burning, deadfalls, pitfalls, and other hunting devices may differ among themselves because of the nature of the terrain and fauna. If the principal game exists in large herds, such as herds of bison or caribou, there is advantage in co-operative hunting, and considerable numbers of peoples may remain together throughout the year, If, however, the game is nonmigratory, occurring in small and scattered groups, it is better hunted by small groups of men who know their territory well. In each case, the cultural repertory of hunting devices may be about the same, but in the first case the society will consist of multifamily or multilineage groups, as among the Athabaskans and Algonkians of Canada and probably the pre-horse Plains bison hunters, and in the second case it will probably consist of localized patrilineal lineages or bands, as among the Bushmen, Congo Negritoes, Australians, Tasmanians, Fuegians, and others. These latter groups consisting of patrilineal bands are similar, as a matter of fact, not because their total environments

are similar—the Bushmen, Australians, and southern Californians live in deserts, the Negritoes in rain forests, and the Fuegians in a cold, rainy area—but because the nature of the game and therefore of their subsistence problem is the same in each case.

Other societies having about the same technological equipment may exhibit other social patterns because the environments differ to the extent that the cultural adaptations must be different. For example, the Eskimo use bows, spears, traps, containers and other widespread technological devices, but, owing to the limited occurrence of fish and sea mammals, their population is so sparse and co-operative hunting is so relatively unrewarding that they are usually dispersed in family groups. For a different but equally compelling reason the Nevada Shoshoni were also fragmented into family groups. In the latter case, the scarcity of game and the predominance of seeds as the subsistence basis greatly restricted economic co-operation and required dispersal of the society into fairly independent family groups.

In the examples of the primitive hunting, gathering, and fishing societies, it is easy to show that if the local environment is to be exploited by means of the culturally derived techniques, there are limitations upon the size and social composition of the groups involved. When agricultural techniques are introduced, man is partially freed from the exigencies of hunting and gathering, and it becomes possible for considerable aggregates of people to live together. Larger aggregates, made possible by increased population and settled communities, provide a higher level of sociocultural integration, the nature of which is determined by the local type of sociocultural integration.

The adaptive processes we have described are properly designated ecological. But attention is directed not simply to the human community as part of the total web of life but to such cultural features as are affected by the adaptations. This in turn requires that primary attention be paid only to relevant environmental features rather than to the web of life for its own sake. Only those features to which the local culture ascribes importance need be considered.

The Method of Cultural Ecology

Although the concept of environmental adaptation underlies all cultural ecology, the procedures must take into account the complexity and level of the culture. It makes a great deal of difference whether a community consists of hunters and gatherers who subsist independently by their own efforts or whether it is an outpost of a wealthy nation, which exploits local mineral wealth and is sustained by railroads, ships, or airplanes. In advanced societies, the nature of the culture core will be determined by a complex technology and by productive arrangements which themselves have a long cultural history.

Three fundamental procedures of cultural ecology are as follows:

First, the interrelationship of exploitative or productive technology and environment must be analyzed. This technology includes a considerable part of what is often called "material culture," but all features may not be of equal importance. In primitive societies, subsistence devices are basic: weapons and instruments for hunting and fishing; containers for gathering and storing food; transportational devices used on

land and water; sources of water and fuel; and, in some environments, means of counteracting excessive cold (clothing and housing) or heat. In more developed societies, agriculture and herding techniques and manufacturing of crucial implements must be considered. In an industrial world, capital and credit arrangements, trade systems and the like are crucial. Socially-derived needs—special tastes in foods, more ample housing and clothing, and a great variety of appurtenances to living—become increasingly important in the productive arrangement as culture develops; and yet these originally were probably more often effects of basic adaptations than causes.

Relevant environmental features depend upon the culture. The simpler cultures are more directly conditioned by the environment than advanced ones. In general, climate, topography, soils, hydrography, vegetational cover, and fauna are crucial, but some features may be more important than others. The spacing of water holes in the desert may be vital to a nomadic seed-gathering people, the habits of game will affect the way hunting is done, and the kinds and seasons of fish runs will determine the habits of riverine and coastal tribes.

Second, the behavior patterns involved in the exploitation of a particular area by means of a particular technology must be analyzed. Some subsistence patterns impose very narrow limits on the general mode of life of the people, while others allow considerable latitude. The gathering of wild vegetable products is usually done by women who work alone or in small groups. Nothing is gained by co-operation and in fact women come into competition with one another. Seed-gatherers, therefore, tend to fragment into small groups unless their resources are very abundant. Hunting, on the other hand, may be either an individual or a collective project, and the nature of hunting societies is determined by culturally prescribed devices for collective hunting as well as by the species. When surrounds, grass-firing, corrals, chutes, and other co-operative methods are employed, the take per man may be much greater than what a lone hunter could bag. Similarly, if circumstances permit, fishing may be done by groups of men using dams, weirs, traps, and nets as well as by individuals.

The use of these more complex and frequently co-operative techniques, however, depends not only upon cultural history—i.e., invention and diffusion—which makes the methods available but upon the environment and its flora and fauna. Deer cannot be hunted advantageously by surrounds, whereas antelope and bison may best be hunted in this way. Slash-and-burn farming in tropical rain forests requires comparatively little co-operation in that a few men clear the land after which their wives plant and cultivate the crops. Dry farming may or may not be co-operative; and irrigation farming may run the gamut of enterprises of ever-increasing size based on collective construction of waterworks.

The exploitative patterns not only depend upon the habits concerned in the direct production of food and of goods but upon facilities for transporting the people to the source of supply or the goods to the people. Watercraft have been a major factor in permitting the growth of settlements beyond what would have been possible for a foot people. Among all nomads, the horse has had an almost revolutionary effect in promoting the growth of large bands.

The third procedure is to ascertain the extent to which the behavior patterns entailed in exploiting the environment affect other aspects of culture. Although technology

and environment prescribe that certain things must be done in certain ways if they are to be done at all, the extent to which these activities are functionally tied to other aspects of culture is a purely empirical problem. In the irrigation areas of early civilizations, the sequence of socio-political forms or cultural cores seems to have been very similar despite variation in many outward details or secondary features of these cultures. If it can be established that the productive arrangements permit great latitude in the sociocultural type, then historical influences may explain the particular type found. The problem is the same in considering modern industrial civilizations. The question is whether industrialization allows such latitude that political democracy, communism, state socialism, and perhaps other forms are equally possible, so that strong historical influences, such as diffused ideology—e.g., propaganda—may supplant one type with another, or whether each type represents an adaptation which is specific to the area.

The third procedure requires a genuinely holistic approach, for if such factors as demography, settlement pattern, kinship structures, land tenure, land use, and other key cultural features are considered separately, their interrelationships to one another and to the environment cannot be grasped. Land use by means of a given technology permits a certain population density. The clustering of this population will depend partly upon where resources occur and upon transportational devices. The composition of these clusters will be a function of their size, of the nature of subsistence activities, and of cultural-historical factors. The ownership of land or resources will reflect subsistence activities on the one hand and the composition of the group on the other. Warfare may be related to the complex of factors just mentioned. In some cases, it may arise out of competition for resources and have a national character. Even when fought for individual honors or religious purposes, it may serve to nucleate settlements in a way that must be related to subsistence activities.

The Methodological Place of Cultural Ecology

Cultural ecology has been described as a methodological tool for ascertaining how the adaptation of a culture to its environment may entail certain changes. In a larger sense, the problem is to determine whether similar adjustments occur in similar environments. Since in any given environment, culture may develop through a succession of very unlike periods, it is sometimes pointed out that environment, the constant, obviously has no relationship to cultural type. This difficulty disappears, however, if the level of sociocultural integration represented by each period is taken into account. Cultural types therefore, must be conceived as constellations of core features which arise out of environmental adaptations and which represent similar levels of integration.

Cultural diffusion, of course, always operates, but in view of the seeming importance of ecological adaptations its role in explaining culture has been greatly overestimated. The extent to which the large variety of world cultures can be systematized in categories of types and explained through cross-cultural regularities of developmental process is purely an empirical matter. Hunches arising out of comparative studies suggest that there are many regularities which can be formulated in terms of similar levels and similar adaptations.

Smallholders, Householders

Robert Netting

Energy and Evolution

The observation that there are two paths that lead to increased agricultural production appears to be obvious, even banal, but the labeling of these trajectories as traditional and modern, preindustrial and industrial, Western and non-Western, or even extensive and intensive, obscures the significant differences and imposes an evolutionary straitjacket on our thinking. Technological and scientific "progress" is an unquestioned good in manufacturing and distributing commodities, so it *must* be the key to "getting agriculture moving," to relieving human want and removing drudgery. The "truths" of Western scientific and engineering knowledge are deemed universal, and only isolation, "peasant conservatism," illiteracy, and poverty impede their transmission and implementation. Each stage of technological advancement from Stone Age to Iron Age, from human muscle power to horsepower, from the steam engine of the Industrial Revolution to the electricity generated by atomic fission, represents an increased capture of energy.

Cultural evolutionists from Lewis Henry Morgan, Sir Edward Tylor, Marx, and Engels to Leslie White (1943) never doubted that the discoveries and inventions that tapped larger sources of energy were the prime engines of change, providing not only more material goods but a higher standard of living, if only their fruits could be distributed equitably throughout society. The corollary view was that supplies of mechanical energy were practically limitless, and that the efficiency of transforming one form of energy to another inevitably increased.[1] Some disillusionment with the side effects of power-hungry civilizations, the degraded soils, the polluted air and water, may now have set in, but the conviction that food production has a fundamental call on energy supplies, and that only a bit of technological rejiggering is needed to spread the Western pattern successfully to a waiting Third World of peasant farms, dies hard.[2]

All energy is not, however, created equal, or equally procreative. Of the fundamental physical sources of energy, sunlight, water, land, and labor are all renewable

over time, but finite in any given period. The technically useful energy of fossil fuels is both finite and nonrenewable. Food production, always a major user of land and solar power, is differentially dependent on human labor and on fuel energy in developing and industrialized countries (Leach 1976: 3). Which factors of production will be used most freely and which will be conserved depends on their relative costs and benefits. Where land is plentiful, readily appropriated, and cheap, and where population is sparse, as on a settlement frontier, or where aridity or mountainous terrain make ordinary farming techniques marginally productive, the first choice is to economize on labor with extensive techniques like slash-and-burn cultivation or open-range herding. This is true regardless of whether we refer to the expansion of Neolithic farmers into Europe or the establishment of cattle ranches in Brazilian rain forests (National Research Council 1992: 67–75). If there are few people present and they have a variety of ways to make a living with relatively little effort, the cost of labor will be high. For intensification to take place under these circumstances, less expensive sources of energy will be sought, and there will be a heavy emphasis on increasing labor productivity, usually by mechanical means (ibid.: 15). With a market that prices the inputs of labor and fuel energy and the outputs of food, practical economic decisions can be clearly specified. The economically appropriate level of energy use is the point at which the marginal monetary value equals the cost of the increment of energy (Lockeretz 1984).

Sustainability: In the Eyes of Beholders and Smallholders

Sustainability is a term that has buzzed rapidly into the popular consciousness trailing clouds of positive affect, which are also evoked by *ecology*, *conservation*, and *environmental protection*. *Sustainability* is a prime candidate to be the watchword of the 1990s, and it is increasingly attached to the agroecology of the smallholder. I have especially emphasized the existence of favorable energy input/output balances on household-operated smallholdings and the dangers of environmental degradation, but the concept of sustainability in common usage covers a multitude of values and goals (Lockeretz 1990; Barbier 1987). Terry Gips (cited in Francis and Youngberg 1990: 4) maintains that "a sustainable agriculture is ecologically sound, economically viable, socially just, and humane." In an Agency for International Development concept paper, sustainability is "the ability of an agricultural system to meet evolving human needs without destroying and, if possible, by improving the natural resource base on which it depends" (cited in ibid.: 5). Sustainable production is an "average level of output over an indefinitely long period which can be sustained without depleting renewable resources on which it depends" (Douglass 1985: 10). These definitions combine environmental parameters with economic and social characteristics in the context of changing interactions.

Several dimensions of sustainability, the physical, chemical, biological, and socio-economic, are identified in the literature (Schelhas 1991), with the degree of emphasis and analytic detail often depending on the scientific specialization of the investigator.[3] There is also a prevailing assumption that traditional cultivators, because of their

low-energy technology, diversified production, small-scale operations, subsistence rather than market orientation, settlement stability, and lack of manufactured inputs, will occupy the sustainable end of the continuum, as opposed to commercial and industrial agriculture. In fact, the presence of these characteristics and their presumed interaction through time must be demonstrated, especially in the case of intensive cultivators, who modify the natural environment more profoundly and permanently than certain other types of land users. Unfortunately, measurements of the following relevant factors through time are seldom available in the case of either smallholder systems or large industrial farms:

1. Physical: soil degradation through erosion, weathering, compaction; diminished water supply, flooding, salinization; depletion of nonrenewable energy sources. Smallholders' techniques of terracing, contour mounding, drainage, irrigation, and diking may in fact be highly developed, and their use of fossil fuels minimal, but environmental deterioration owing to climatic perturbations or gradually increasing overuse may become apparent.

2. Chemical: decline in soil-nutrient status; decreasing responses to chemical applications, necessitating higher dosages; buildup of local or regional toxicity from the residues of fertilizers, pesticides, and herbicides. Rapid population increases among intensive farmers with no other economic options or the drive to raise production rapidly for the market may put pressure on resources so great that yields decline. There are unresolved questions as to whether the high-yielding seeds, chemical inputs, and mechanization of the Green Revolution as adopted by many smallholders will compromise their agricultural sustainability.

3. Biological: loss of biodiversity; declining ecosystem stability and resilience. Only groups of low-density foragers or shifting cultivators in large natural ecosystems may pose no threat to biological diversity (Schelhas 1991). Intensive cultivation can replace natural ecosystems, prevent their regeneration, and cause absolute declines in natural biodiversity. The substitution of an artificially diversified system of polycultures or interplanting, integrated crop/livestock regimes, and crop rotation can, however, increase total yields, while reducing yield variability, insect predation, and weed competition (Altieri 1987; Gliessman 1984). Such systems appear to be biologically more stable and more energy-efficient than the monocultures characteristic of largeholders.

4. Socioeconomic: providing sufficient sustained economic returns over the long run on existing cultivated lands so that people can achieve a continuing adequate livelihood (Schelhas 1991). Since the goals are social and economic, variable cross-culturally, and potentially changing through time, such sustainability is particularly difficult to measure objectively (Barbier 1987). Stable production may not be consonant with rising subsistence needs, greater market participation, lower agricultural prices, or higher input costs.

My emphasis on the process of intensification suggests that smallholders do indeed adapt to changing population and market forces, and that households have a variety of off-farm production strategies. This book is, in fact, more directly concerned with the dynamics of smallholder social and economic systems as they encounter the challenge of long-term biological sustainability than it is with the physical stability of such ecosystems. The management choices that the smallholder makes in the light

of intimate knowledge of the land are unlikely to involve short-range maximization of production. Farmers who survive must hedge against the uncontrollable fluctuations of the climate *and* the market. The very long time-horizon of the family's intergenerational security and its valuable, heritable property give the smallholder household a unique perspective on sustainability. There is room to question the doctrinaire position of many "deep ecologists" that sustainable production and economic growth are incompatible goals (Hildyard 1995), or that a market economy, population increase, and the new technologies of capitalism are inevitably at odds with sustainable systems (Weiskel 1989). But the suggestion that smallholder systems that can be shown to be sustainably productive, biologically regenerative, and energy-efficient tend also to be equity-enhancing, participative, and socially just (Barbier 1987: 104) is stimulating and provocative. Indigenous smallholder systems that show a favorable energy input/output balance, achieved by the application of labor and management rather than large amounts of unrenewable energy, exhibit a feasible solution to the problems of resource exhaustion, pollution, and environmental degradation that so often accompany large-scale, energy-intensive agriculture.

<div style="text-align:center">N O T E S</div>

1. Leslie White's "law of cultural evolution" ("culture develops when the amount of energy harnessed by man per capita per year is increased; or as the efficiency of the technological means of putting this energy to work is increased; or, as both factors are simultaneously increased" White 1943: 338) explicitly focuses on variable nonhuman energy in tools and practices such as agriculture, while the human energy factor, along with particular skills, is treated as a constant. More "need-serving goods" come, not from more person-days of work with equal or even declining returns to labor, but only from the technological capture of energy that increases "the productivity of human labor" (ibid.: 346). "Efficiency" is ambiguously defined as "the efficiency with which human energy is expended mechanically, … the efficiency of tools only" (ibid.: 337), but no attempt is made to measure human or other energy inputs quantitatively or to address the inverse relationship between increasing returns on human work and potentially declining returns on mechanical energy. (Analogies between low-cost electricity and the energy of a human slave [ibid.: 345] are merely anecdotal.) When evolution is modeled in this reductionist manner, technological change raising the amount of energy used per capita precedes and produces population growth, improves human well-being and comfort, grants "independence of nature," and raises output per unit of labor (ibid.: 342–43). To the degree that the smallholder adaptation is a low-energy alternative with less mechanical and more human energy expended, it would presumably be judged evolutionarily retrograde or reflecting a barrier to cultural development.

2. The evolutionary assumption that manual labor in agriculture is backward, extremely time-consuming, onerous, and coerced, and that replacement of such labor by technological energy is therefore the only route to abundance and freedom, is still very much with us. "An old saying has it, 'slavery will persist until the loom weaves itself.' All ancient civilizations, no matter how enlightened or creative, rested on slavery and on grinding human labor, because human and animal muscle power were the principal forms of energy available for mechanical work. The discovery of ways to use less expensive sources of energy than human muscles made it possible for men to be free. The men and women of rural India are tied to poverty and misery

because they use too little energy and use it inefficiently, and nearly all they use is secured by their own physical efforts. A transformation of rural Indian society could be brought about by increasing the quantity and improving the technology of energy use" (Revelle 1976: 974).

3. Gordon Conway and Edward Barbier point to a source of confusion in the different definitions that various disciplinary groups attach to the term *sustainable agriculture* (1990: 9). Four interpretations are: (1) agriculturalists: food sufficiency by any means; (2) environmentalists: responsible uses of the environment, stewardship of natural resources; (3) economists: efficiency, the use of scarce resources to benefit present and future populations; and (4) sociologists: production consonant with traditional cultures, values, and institutions. Clearly, the productivity, stability, and equitability that are the goals of sustainable development projects may be in conflict, and there are necessary trade-offs among them (ibid.: 39–43).

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Ecosystem Ecology in Biology and Anthropology

Emilio Moran

From the broad generalities of the environmental determinists and the detailed inductive findings of the possibilists, Steward proposed a research method that paid careful attention to empirical details and that causally linked the *cognized environment*,[1] social organization, and the behavioral expressions of human resource use. Steward delimited, more than anyone before him, the field of human/environment interactions. He viewed social institutions as having a functional unity that expressed solutions to recurrent subsistence problems. Steward's use of functionalism was concerned with the operation of a variable in relation to a limited set of variables, not in relation to the entire social system, and thus did not fall prey to the weaknesses of then current British functionalism. British functionalists emphasized the role of social institutions in the maintenance of structural equilibrium. Steward steered "cultural ecology" towards a concern with how single systems change through time and how the causal relationships within that system can actually lead to change.

Most attempts to operationalize the cultural ecological approach required modifications of the basic research strategy laid out by Steward (cf. Netting 1968; Sweet 1965; Sahlins 1961). His concept of the culture core proved to underestimate the scope, complexity, variability, and subtlety of environmental and social systems (Geertz 1963). The cultural ecological approach of comparing societies across time and space in search of causal explanations was judged to be flawed a decade later. Vayda and Rappaport (1968), among others, found the concept of the culture core, and the cultural ecological approach, to give undue weight to culture as the primary unit of analysis, and found the presumption that organization for subsistence had causal priority to other aspects of human society and culture to be both untested and premature (Geertz 1963).

Ecosystem Ecology in Anthropology

Critiques of Steward's cultural ecology paradigm led anthropologists towards a more explicitly biological paradigm. Geertz (1963) was the first to argue for the usefulness of

the ecosystem as a unit of analysis. Its merits were eloquently stated: systems theory provided a broad framework, essentially qualitative and descriptive, that emphasized the internal dynamics of such systems and how they develop and change. The explicit adoption of biological concepts in anthropology led to provocative and sometimes productive results. As early as 1956, Barth applied the concept of the "niche" to explain the behavior of adjacent groups and the evolution of ethnic boundaries. Coe and Flannery (1964) noted the use of multiple ecological niches by prehistoric peoples of South Coastal Guatemala. Neither the niche nor other concepts from biology had as significant an impact on anthropological thinking, however, as did the ecosystem concept (with the possible exception of the concept of adaptation, see discussion in Little 1982).

The ecosystem approach was attractive to anthropologists for a number of reasons. It endorsed holistic studies of humans in their physical environment. It was elaborated in terms of structure, function and equilibrium that suggested the possibility of common principles in biology and anthropology (Winterhalder 1984). No less important was the connection between ecosystem ecology and advocacy of habitat and species preservation connected with concern for non-industrial populations at a time of deep environmental and social concern (i.e. the 1960's and 1990's).

Each subfield of anthropology was differentially affected by the ecosystem approach. Archeologists have always been conscious of the environmental context of society. However, in many cases the environment has been treated as a static background against which human dynamics occur (Butzer 1982:4). In part, the problem was the lack of "an adequate conceptual framework within which to analyze complex interrelationships among multivariate phenomena" (*ibid.* p. 5). The seminal paper in archeology may have been Flannery's (1968) in which he postulated the useful applications of systems theory to archeological investigations. According to systems-oriented archeologists, "culture is defined not as aggregates of shared norms (and artifacts) but as interacting behavioral systems" (Plog 1975:208). Emphasis was given to variability, multivariate causality and process (Clarke 1968).

In archeology, the ecosystem approach has proven to be a useful heuristic device leading archeologists to think in terms of systemic interrelationships. It was rarely used as a spatial unit of analysis. Thus, archeology did not fall into the trap of making ecosystems coterminous with biogeographical units or sites. Rather, the ecosystem approach encouraged the study of the landscape at large, the use of catchment analysis and a movement away from sites to larger regional surveys. Ecological archeology has benefitted from the breadth of the concept and appears not to have suffered from many of the problems that seem to have plagued ecosystem research in physical and social anthropology. Unlike energy flow studies (or decision-making studies), which emphasize present-time measurement, ecological archeology deals with spatio-temporal variability. The long time frames of the archeological record reflect aggregate changes in the physical environment and in the material manifestations of social and cultural change (Butzer 1982), thereby avoiding the pitfalls of synchronic equilibrium-oriented functionalism (Smith 1984).

Special note must be taken that archeology has found that ecosystems are particularly useful when they model regional-scale systems, rather than individual sites or

communities. This is consistent with the higher level of organization which ecosystems represent in biological systems and may very well imply that social anthropologists and bioanthropologists may want to do likewise in the future. Processes like agricultural intensification may have multiple causes, not necessarily environmental ones. The ecosystem approach can accommodate such a view—indeed, it always stood for modelling complex systems in which the forcing functions became clear only in the course of studying the whole gamut of interrelations.

In physical anthropology, Little (1982) has noted that in the 1950's interest developed in the study of adaptation to environment. This "new physical anthropology" focused on studies of body morphology and composition, physiological response to environmental stress, demographic and health parameters of adaptation, and genetic attributes of populations (Harrison *et al.* 1964).

The research of the new physical anthropologists found support in the International Biological Program (IBP) which began *circa* 1964. A "human adaptability" section was included in the program, intended to cover "the ecology of mankind" from the perspectives of health, environmental physiology, population genetics, developmental biology, and demography (Weiner 1965). Even though doubts were expressed at the 1964 symposium at Burg Wartenstein about the omission of social/cultural aspects of adaptability, the perceived gap between the methods of human biology and social science led to no solution to this problem (Weiner in Worthington 1975). Only a decade later did an IBP workshop begin to seek ways to bring together ecologists and social scientists so that humans could be incorporated into the IBP ecosystem approach (Little and Friedman 1973).

The 1964–74 decade of IBP research led to more sophisticated methods and greater awareness of the limitations of original formulations. Practitioners now go beyond evaluating systems in terms of a single flow and, instead, consider multiple flows and constraints. Indeed, energy flow analysis[2] is seen as a method quite distinct from an adaptive framework or any other theoretical stance (Thomas 1973). The flaws of human energy flow studies carried out in the 1960's and early 1970's (cf. critique in Burnham 1982) resulted from preliminary efforts to test the utility of the new methods for anthropology. Indeed, energy flow analysis is a convenient starting point in understanding the complexity of human systems—systems in which social relations and historical process play a primary role (Winterhalder 1984). To fully understand them, however, other methods are more appropriate to social and ideological analysis.

In social anthropology and human geography, ecological studies have become common since the 1970's. The majority of studies have not depended on the ecosystem approach, although some notable ones have (e.g. Rappaport 1967; Clarke 1971; Kemp 1971; Waddell 1972; Nietschmann 1973). For all intents and purposes, the use of ecosystems as units of analysis did not radically alter the scope of research: research still focused on small, non-urban communities.

A generation of anthropologists, trained in ecology and systems theory, went to the field to measure the flow of energy through the trophic levels of the ecosystems of which humans were but a part (Rappaport 1967). The choice of research site was still a local community, often treated as a closed system for the purposes of analysis. Emphasis on micro-level study in ecology was well argued by Brookfield (1970) who

pointed out that an adaptive system can best be studied at this level because such a system model "acquires the closest orthomorphism with empirical fact" (1970:20). Micro-level studies using the ecosystem as a "unit of analysis" have provided valuable insights into flow of energy, health and nutritional status of populations, relative efficiency rates of various forms of labor organization and cropping practices, and social organizational aspects of subsistence strategies (cf. discussion in Netting 1977, Moran 1982, 1981).

Efforts to measure the flow of energy and the cycles of matter through human ecosystems served to detail more than before the environmental setting of specific populations. Energetics emphasizes the collection of data on a sample of components and flows so that the data may be aggregated and used in simulation models. The goal is to understand system dynamics by manipulating rates of flow given current conditions in the ecosystem. However, the value of these measures in studying small scale populations may have been overestimated in the 1960's. Flow of energy and cycles of matter are aggregate measures appropriate to macro-ecosystem description, but provide little insight into human variation in resource use in given localities—a matter of great interest in anthropology (Smith 1984).

Just as the ecosystem approach helped biology broaden its interests to include neglected physical environmental factors, so it affected anthropology. The ecosystem approach provided greater context and holism to the study of human society by its emphasis on the biological basis of productivity and served as a needed complement to the cultural ecology approach. By stressing complex links of mutual causality, the ecosystem approach contributed to the demise of environmental and cultural deterministic approaches in anthropology and took it towards a more relational and interactional approach to analysis even if practitioners preferred to dissociate themselves from the concept (cf. Johnson and Earle 1987; Grossman 1984; Richards 1985; Morren 1986; Little and Horowitz 1987; McCay and Acheson 1987; Sheridan 1988).

A number of problems emerged in the process of applying the ecosystem approach to anthropology (see also the assessments by Vayda and McCay 1975; and Winterhalder 1984): a) a tendency to reify the ecosystem and to give it the properties of a biological organism; b) an overemphasis on predetermined measures of adaptation such as energetic "efficiency"; c) a tendency for models to ignore time and structural change, thereby overemphasizing stability in ecosystems; d) a tendency to neglect the role of individuals; e) lack of clear criteria for boundary definition; and f) level shifting between field study and analysis.

Reification of the Ecosystem

The tendency of some authors to reify the ecosystem and to transform the concept into an entity having organic characteristics appears to have been a product of the initial excitement generated by the notion of ecosystem. When the volume *The Ecosystem Concept in Natural Resource Management* (Van Dyne 1969) appeared, the editor and some of the contributors noted that they were at the threshold of a major development in the field of ecology. The concept was hailed as an answer to the divisions

within bioecology and gained a large popular following during the "ecology move-ment" of the 1960's and early 1970's—perhaps because of the very superorganic and equilibrium characteristics that were later to be faulted. It is evident that, for some, ecosystems became a shorthand for the biome or community and that this heuristic-ally useful physical/biological construct was unwittingly endowed with purely biolog-ical attributes. As Golley has noted, it is generally understood that ecosystems are subject to the laws of biological evolution but they are also subject to laws not yet completely understood and that are not exclusively biological (1984).

When an ecosystem is viewed as an organic entity, it is assigned properties such as self-regulation, maximization of energy through-flow, and having "strategies for survival." This view is similar to earlier "superorganic" approaches in anthropology (Durkheim 1915; Kroeber 1917; White 1949). Few ecological anthropologists today would accept the notion that ecosystems "have strategies" and even fewer would sug-gest that energy maximization is always "adaptive" in human ecosystems. The notion of self-regulation is more problematic since it devolves around the question of whether ecosystems per se can be cybernetic, e.g. use information for self-regulation (Engelberg and Boyarsky 1979). Patten and Odum (1981) believe this to be a pseudois-sue that distracts us from more fundamental concerns: how are we to think about ecosystems and how are we to place them within the scheme of known systems?

"*The Calorific Obsession*"

Perhaps no other problem has received more attention within anthropology in recent years than the charge that ecosystem studies were "obsessed with calories". Many young scientists took great pains to measure energy flow through ecosystems under the assumption that energy was the only measurable common denominator that structured ecosystems and that could serve to define their function. Energy flow stud-ies conducted in the 1960's and 1970's demonstrated the descriptive usefulness of energetics before, during, and after field investigations. What they also proved was that the forcing functions of ecosystems varied from site to site and that it was naive to postulate energy as the organizing basis for all extant ecosystems (e.g. Kemp 1971; Rappaport 1971; Thomas 1973; Moran 1973; Vayda and McCay 1975; Ellen 1978).

The early energy flow studies delineated flows of energy and established magni-tudes. They did not, however, give sufficient attention to the numerous decisions made which control those same flows (cf. Adams 1978). Winterhalder suggests that energy flow studies stand to benefit from joining hands with neo-Ricardian econom-ics, given the latter's emphasis on the circular processes in which consumption feeds back into production. "Adapted to neo-Ricardian theory, energy flow methods could help to rigorously quantify and trace the partitioning of production" (1984:305). This has taken place in part in the study of optimal foraging strategies among hunter/gatherers (Smith 1984; Winterhalder and Smith 1981) and has been suggested as ap-plicable to horticultural populations (Gudeman 1978; Keegan 1986).

Today, few would suggest that measurement of energy flow ought to be *the* central concern of ecosystem studies. Concern has shifted, instead, to material cycling and to

the impact of external factors upon given ecosystems (Shugart and O'Neill 1979; Barrett and Rosenberg 1981; Cooley and Golley 1984). Bioecologists are less concerned today with calories than with the loss of whole ecosystems, with loss of biotic diversity, and with species extinction (Jordan 1987; National Science Board 1989).

Ignoring Historical Factors

Next to the "calorific obsession," ecosystem research has been faulted most often for ignoring time and historical change. Past construction of ahistorical models, in turn, led to an apparent overemphasis on stability and homeostasis rather than on cumulative change. The emphasis on self-maintenance and self-regulating characteristics of ecosystems (Jordan 1981) also contributed to a view that man's role was essentially disruptive of "natural processes." Research shows that attention to history is not incompatible with ecosystem research. Recent inclusion of a historical dimension in ecosystem studies provides an appreciation of the processes of stability and change in human ecosystems. At any given time, systems appear to be seeking, or be at, equilibrium, whereas over time they appear to be undergoing continuous and cumulative change leading to structural transformation.

It is paradoxical that ecological anthropological studies have only rarely explored the population variable over time, given the importance of demographics in population ecology. In part, the reason must be sought in the very study of isolated small communities lacking historical records of births, deaths, and marriage. To see a human ecosystem in process, rather than as a synchronic snapshot, requires dependable, continuous, and relatively complete records for a population over a long period of time. Such ideal conditions are rarely found except in modern-period Western Europe and North America.

Demographically deep studies represent a relatively new direction in ecological anthropology (cf. Baker and Sanders 1971; Cooke 1972; Polgar 1972; Zubrow 1976; Netting, 1981; Hammel 1988). Demographic studies lead us away from models emphasizing closure, constraints to energy flow and negative feedback and toward questions emphasizing evolutionary change in systems (Zubrow 1976:21). Without such time depth, it is not possible to explain how systems come to be nor how they change. Additionally, population data have the advantage of being observable, replicable, quantifiable, and cross-culturally comparable (Zubrow 1976:4).

The change from a synchronic to a more diachronic ecological anthropology does not require an abandonment of the ecosystem approach. What it does imply is an extension of the tools of ecological analysis to include also the tools offered by historical demography. The seminal work on this topic is generally acknowledged to be Boserup's *The Conditions of Agricultural Growth* (1965). Cohen (1977), Basehart (1973), Bayliss-Smith (1974), Berreman (1978), Harner (1970), Netting (1973), and Vasey (1979), are but a few of the many who sought to test the validity of Boserup's thesis that population growth drove technological change and the move towards intensification. The tools of historical demography to date have required extensive records of property owned and controlled by households, records of household composition and labor supply,

and both total production and marketable production. Whether what we learn about human population dynamics in these settings can be applied to the human/habitat interactions of preindustrial foragers and isolated horticulturalists remains to be seen. It can be argued, however, that the worldwide incorporation of scattered socio-political units within larger economic and political systems makes it impossible to treat local communities anymore as closed systems even for analytical purposes.

The Role of Individuals

Ecosystem approaches have tended to focus on the population and neglected the decision-making activities of individuals. In part, this resulted from the higher level of organization that ecosystems represent within the scheme of systems and from the cybernetic and equilibrium assumptions that usually accompanied it. Adoption of an individual, micro-economic and neo-Darwinian evolutionary approach, to the neglect of an ecosystem approach, is likely to create as many problems as it solves. Evolutionary and ecosystem perspectives should be seen as complementary, rather than exclusionary—e.g. energy flow studies would benefit from knowing how the actions of individuals choosing from among alternatives alter flow networks (Winterhalder 1984). On the other hand, some questions (e.g. desertification, global warming, and tropical deforestation) demand that units larger than individuals be engaged in analysis (Schlesinger *et al.* 1990; Peck 1990).

Even the adoption of the household as a unit of analysis, as some have proposed, does not free one from trying to deal with the role of individuals. It is becoming increasingly clear that households do not act as undifferentiated collectives but, rather, embody individuals who engage in complex negotiations. These negotiations embody cultural expectations, social rank, gender hierarchies, age, and other demographic considerations which shape the outcomes summarized as "household behavior" or "decisions". Attention to the internal dynamics of households becomes necessary to understand the social relations of production, consumption, and distribution—although this may not be possible very often in archeological research, where "household" commonly refers to a "residential unit".

Problems of Boundary Definition

Just as the time dimension was long overlooked, so was attention to the criteria for boundary definition. The common wisdom was that the ecosystem was a flexible unit and that the boundaries were determined by the goals of the investigator. Any unit which provides the empirical conditions for defining a boundary may constitute an ecosystem for analytical purposes. However, most human ecosystems do not have the clear-cut boundaries that a brook, a pond, or an island offers.

Rappaport (1967) defined the boundaries of the ecosystem he studied by using the concept of "territoriality." The Tsembaga Maring of New Guinea, as horticulturalists and as the ecologically dominant species, defined what the ecosystem, or territory, was

through their regulatory operations (Rappaport 1967:148). This is a basically satisfying solution to the question of boundary definition except for two implicit problems: how do ecosystem boundaries change through time and how do shifts in boundary definition relate to internal and external structural or functional relations?

One of the most important steps in dealing with this problem is the identification of inputs and outputs and their measurement. Input/output analysis reveals the status of the system defined for investigation, indicates the system's storage capacity, its resilience to external variation in input, and helps identify structural changes likely to occur. The input/output fluxes of the whole system have specific properties which cannot be anticipated by investigating the system's component parts regardless of their importance (Schulze and Zwölfer 1987:8). Thus, the central problem of input/output analysis is the definition of the system's boundaries in space and time. The scale chosen will depend on the type of process under consideration. In some cases the system will be defined by the material cycles, in others by energy fluxes, in others by historical boundaries in terms of people-vegetation-abiotic interactions. Contemporary conservation and restoration biologists define ecosystems as having integral and degraded patches and attempt to restore degraded patches in terms of the input/output relations that characterize the undegraded, or integral, parts of the ecosystem in question (Jordan 1987). This notion does not assume ecosystem equilibrium or a naive notion of reconstructing an "ideal climax" condition. Instead, it seeks to return the system to some degree of structural integrity and replication of functional interrelations, although the actual species composition, and the "details" of the system may be quite different from any of its earlier states (Allen 1988; Berger 1990).

Bounding one's research is an ever present challenge to be faced by both biologists and anthropologists. By assuming that ecosystems are purely and subjectively definable, yet also somehow coterminous with biomes and other biogeographical units, creates real problems in defining clear sampling criteria. Environmental "patchiness" and heterogeneity, animal mobility, and massive ecosystem change due to natural and man-made disasters have received little attention as they affect one's sample population, for example. There has been progress in this regard. Clearly, time, space, and hierarchical level all need to be accounted for in ecological analysis.

Level and Scale Shifting

Whereas it is normal and quite common to understand one level of analysis in terms of the other, such a tack may not be appropriate. Indeed, this may be the most serious limitation of the ecosystem approach—although it has been rarely mentioned by the critics. All we have for most macro-ecosystems is data for a few sites, for a limited time period, and on only some aspects of the whole system of interactions. From an analytic perspective, one cannot confidently use site-specific studies as a basis for macro-ecosystem models. Geographers, of all scientists, have shown the most sensitivity to this constraint, particularly in reference to how one can understand a large region while only studying small areas within it (McCarthy *et al.* 1956; Dogan and Rokkam 1960).

Biologists and anthropologists deal with systems of very different scales in space and time. Commonly, biologists focus on particular components of ecosystems rather than on the whole system. The spatial scale can go from a few square kilometers to a whole watershed. Nevertheless, regardless of scale, the diversity and complexity of the system has to be reduced to a manageable model of the system, if analysis of the ecosystem is desired. On the other hand, if processes are to be understood, the reverse process is called for: isolating that process from the other system processes. The dilemma between the reductionist view of single processes and the deductivist view of systems is a persistent one—although ultimately both approaches are necessary (Schulze and Zwölfer 1987:3). In addition, the stochasticity of many environmental parameters, such as rainfall and temperature, makes predictive models of uncertain accuracy.

Anthropologists and ecologists have shown less caution about the problems posed by scale and level shifting. Odum (1971) provides few cautionary words about the pitfalls of extrapolating evidence from single sites to macro-systems. Current trends in both ecology and anthropology suggest that the macro-ecosystem level may not be appropriate for dealing with questions of human impact and resource management except in very broad terms, like "seeking that industrial nations reduce CFC emissions by 20% by the year 2000." This global approach to environment is necessary, given that the problems posed by industrial emissions cut across national boundaries and require concerted, or global, agreement on what each nation will do to combat the problem (National Science Board 1989). On the other hand, it would be a mistake to think that resource management will be adequately addressed by these broad policies. Resource management is ultimately a site-specific task in which social, political, legal, and historical dimensions are at least as important as environmental ones. Local actions have global consequences when they converge in given directions, but corrective actions have to deal with the motives for the actions of individuals who act rationally, within the incentives and experience within which they live. This is a very exciting arena to which ecological anthropologists could have much to contribute in the decades ahead, if they embrace multidisciplinarity (Dahlberg and Bennett 1986).

NOTES

1. Although the term "cognized environment" was introduced later, it is accurate in describing Steward's notion of "selected features of an environment of greatest relevance to a population's subsistence."

2. Energy flow analysis refers to methods that attempt to measure the chemical transformation of solar energy into biomass and its gradual diffusion and loss through a food web (cf. Odum 1971; Moran 1982).

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Gender and the Environment
A Feminist Political Ecology Perspective

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The convergence of interest in environment, gender, and development has emerged under conditions of rapid restructuring of economies, ecologies, cultures, and polities from global to local levels. Global economic, political, and environmental changes have affected both men and women as stakeholders and actors in resource use and allocation, environmental management, and the creation of environmental norms of health and well-being. Some scholars and activists see no gender differences in the ways human beings relate to the environment, except as they are affected by the constraints imposed by inequitable political and economic structures. Others see the gendered experience of environment as a major difference rooted in biology. We suggest that there are *real*, not imagined, gender differences in experiences of, responsibilities for, and interests in "nature" and environments, but that these differences are not rooted in biology per se. Rather, they derive from the social interpretation of biology and social constructs of gender, which vary by culture, class, race, and place and are subject to individual and social change.

In this volume, we explore the significance of these differences and the ways in which various movements, scholars, and institutions have dealt with gendered perspectives on environmental problems, concerns, and solutions. The major schools of feminist scholarship and activism on the environment can be described as:

1. ecofeminist;
2. feminist environmentalist;
3. socialist feminist;
4. feminist poststructuralist; and
5. environmentalist.

Ecofeminists posit a close connection between women and nature based on a shared history of oppression by patriarchal institutions and dominant Western culture, as

well as a positive identification by women with nature. Some ecofeminists attribute this connection to intrinsic biological attributes (an essentialist position), while others see the women/nature affinity as a social construct to be embraced and fostered (Plumwood 1993; Merchant 1981, 1989; King 1989; Shiva 1989; Mies and Shiva 1994; Rocheleau 1995). Feminist environmentalism as articulated by Bina Agarwal (1991) emphasizes gendered interests in particular resources and ecological processes on the basis of materially distinct daily work and responsibilities (Seager 1993; Hynes 1989). Socialist feminists have focused on the incorporation of gender into political economy, using concepts of production and reproduction to delineate men's and women's roles in economic systems. They identify both women and environment with reproductive roles in economies of uneven development (Deere and De Leon 1987; Sen and Grown 1987; Sen 1994) and take issue with ecofeminists over biologically based portrayals of women as nurturers (Jackson 1993a and b). Feminist poststructuralists explain gendered experience of environment as a manifestation of situated knowledges that are shaped by many dimensions of identity and difference, including gender, race, class, ethnicity, and age, among others (Haraway 1991; Harding 1986; Mohanty 1991). This perspective is informed by feminist critiques of science (Haraway 1989; Harding 1991) as well as poststructural critiques of development (Escobar 1995; Sachs 1992) and embraces complexity to clarify the relation between gender, environment, and development. Finally, many environmentalists have begun to deal with gender within a liberal feminist perspective to treat women as both participants and partners in environmental protection and conservation programs (Bramble 1992; Bath 1995).

We draw on these views of gender and environment to elaborate a new conceptual framework, which we call feminist political ecology. It links some of the insights of feminist cultural ecology (Fortmann 1988; Hoskins 1988; Rocheleau 1988a and b; Leach 1994; Croll and Parkin 1993) and political ecology (Schmink and Wood 1987, 1992; Thrupp 1989; Carney 1993; Peet and Watts 1993; Blaikie and Brookfield 1987; Schroeder 1993; Jarosz 1993; Pulido 1991; Bruce, Fortmann, and Nhira 1993) with those of feminist geography (Fitzsimmons 1986; Pratt and Hanson 1994; Hartmann 1994; Katz and Monk 1993a and b; Momsen 1993a and b; Townsend 1995) and feminist political economy (Stamp 1989; Agarwal 1995; Arizpe 1993; Arizpe, Stone, and Major 1993; Thomas-Slayter 1992; Joekes 1995; Jackson 1985, 1995; Mackenzie 1995). This approach begins with the concern of the political ecologists who emphasize decision-making processes and the social, political, and economic context that shapes environmental policies and practices. Political ecologists have focused largely on the uneven distribution of access to and control over resources on the basis of class and ethnicity (Peet and Watts 1993). Feminist political ecology treats gender as a critical variable in shaping resource access and control, interacting with class, caste, race, culture, and ethnicity to shape processes of ecological change, the struggle of men and women to sustain ecologically viable livelihoods, and the prospects of any community for "sustainable development."

The analytical framework presented here brings a feminist perspective to political ecology. It seeks to understand and interpret local experience in the context of global processes of environmental and economic change. We begin by joining three critical

themes. The first is *gendered knowledge* as it is reflected in an emerging "science of survival" that encompasses the creation, maintenance, and protection of healthy environments at home, at work, and in regional ecosystems. Second, we consider *gendered environmental rights and responsibilities*, including property, resources, space, and all the variations of legal and customary rights that are "gendered." Our third theme is *gendered environmental politics and grassroots activism*. The recent surge in women's involvement in collective struggles over natural resource and environmental issues is contributing to a redefinition of their identities, the meaning of gender, and the nature of environmental problems.

Several common threads have run throughout the scholarship and the movements that address the convergence of gender, science, and environment, but common concerns have often been obscured by the distinct discourses of resistance, critique, and alternative practice. We draw the following points into a common perspective and the authors pursue each of them in the case studies, as appropriate:

1. Women's multiple roles as producers, reproducers, and "consumers" have required women to develop and maintain their integrative abilities to deal with complex systems of household, community, and landscape and have often brought them into conflict with specialized sciences that focus on only one of these domains. The conflict revolves around the separation of domains of knowledge, as well as the separation of knowing and doing, and of "formal" and "informal" knowledge.

2. While women throughout the world under various political and economic systems are to some extent involved in commercial activities (Berry 1989; Jackson 1985), they are often responsible for providing or managing the fundamental necessities of daily life (food, water, fuel, clothing) and are most often those charged with healthcare, cleaning, and childcare in the home, if not at the community level (Moser 1989). This responsibility puts women in a position to oppose threats to health, life, and vital subsistence resources, regardless of economic incentives, and to view environmental issues from the perspective of the home, as well as that of personal and family health. This does not preclude women from engaging in economic interests, but suggests that they will almost always be influenced by responsibilities for home, health—and in many cases—basic subsistence.

3. Both health and ecology are amenable to feminist and alternative approaches to practice since they do not necessarily require special instrumentation, but rather focus on the "objects" and experience of everyday life, much of which is available through direct observation (Levins 1989). While some aspects of health and ecology have become highly technical, there is much new insight and information to contribute to these disciplines that is still available to observation without specialized instruments beyond the reach of ordinary folk. There is also scope for a feminist practice of ecology that uses specialized tools differently and for different ends.

4. While formal science relies heavily on fragmentation, replication, abstraction, and quantification (Levins 1989), many women have cited the importance of integration and a more holistic approach to environmental and health issues (Candib 1995). Feminist scholars have shown that some women researchers in professional sciences have used distinct approaches based on skills acquired in their socialization as women (Keller 1984; Hynes 1989, 1991, 1992). On a more personal and everyday level, some

grassroots women's groups have explicitly stated that "our first environment is our bodies" (Gita Sen, personal communication), calling for a more integrative approach to health, environment, and family planning in development, welfare, and environmental programs.

5. Most feminist or women's environmental movements have incorporated some or all of the elements of the feminist critique of science as summarized by Sandra Harding (1987). The five classes of critique address:

1. inequity of participation and power in science-as-usual;
2. abuse and misuse of science on and about women;
3. assumptions of value-free objectivity and universality in science;
4. use of culturally embedded, gendered metaphors in scientific explanation and interpretation; and
5. development of alternative ways of knowing and ways of learning based on everyday life, women's experience, and explicit statement of values.

Feminist political ecology addresses the convergence of gender, science, and environment in academic and political discourse as well as in everyday life and in the social movements that have brought new focus to this issue.

These sciences occur in several forms, from local environmental knowledge (for example, which plants can cure us and how we can protect them), to recent innovations (new techniques to manage soil, water, and trees; new ways to diagnose exposure to toxic chemicals), to research on the unknown (what is making us sick; or how we can maintain our forest plants in a changing landscape). These various sciences are practiced by diverse groups from rural herbalists and forest farmers to suburban residents, professional nurses, environmental engineers and urban residents and factory workers. While there are many other axes of difference that may shape peoples' experience and understanding of "environment" and their sciences of ecology, feminist political ecology focuses on gender, while including discussions of interactions with class, race, age, ethnicity, and nationality.

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A View from a Point
Ethnoecology as Situated Knowledge

Virginia D. Nazarea

In 1954, Harold Conklin wrote his dissertation on "The Relation of the Hanunuo Culture to the Plant World." In the same year, he introduced what he called "the ethnoecological approach" in a seminal paper that was to dismantle the dominant view on shifting cultivation as a haphazard, destructive, and primitive way of making a living. What came after, from the midfifties to the midseventies, was a testimony to the power of the idea that Conklin had unleashed (for useful reviews, see Hunn 1989; Ford 1978; Fowler 1977; Toledo 1992). The prefix "ethno" came to denote not merely a localized application of a branch of study (for example, ethnobotany as the botany of a local group from an outsider's—that is, an investigator's—perspective) but also, following the works of Conklin (1954, 1961), Goodenough (1957), Frake (1962), Sturtevant (1964), and many others, a serious attempt toward the understanding of local understanding (the so-called native point of view) about a realm of experience. An explosion of research papers, not to mention entire programs at prestigious universities, systematically documented and analyzed folk classification and paradigms pertaining to plants, animals, firewood, soils, water, illness, and the human body until only the most incorrigible could remain unimpressed by the logic, complexity, and sophistication of local knowledge.

Anthropologists and nonanthropologists alike could not stop marveling at why, to use Brent Berlin's phrase (1992:5), "non-literates 'know so much' about nature." This sense of amazement and perplexity has been pursued, broadly speaking, in two different directions. One, as exemplified by Conklin's original conception of ethnoecology, is to demonstrate Western scientific ignorance about other peoples' ways of thinking and doing, and to point out its arrogance in dismissing anything that is different as being inferior. The other, as exemplified by the methodical investigation of Tzeltal ethnobotany by Berlin, Breedlove, and Raven (1974) is to cross-refer native systems of classification to the Western scientific tradition—in this case, the Linnaean taxonomic system—and to demonstrate how native systems virtually match scientific taxonomies rank by rank, category by category.

Both approaches led to a qualitative leap in the way local knowledge is regarded, causing a radical shift in mindset from viewing native systems of thought as naive and rudimentary, even savage, to a recognition that local cultures know their plant, animal, and physical resources intimately and are expert at juggling their options for meeting day-to-day requirements and making the most of ephemeral opportunities. Ethnoscience introduced a methodological rigor and theoretical depth that had been quite unknown in past cataloguing of the local uses of biological resources. There is a difference between the two approaches, however, if not by intent then at least by implication. I would argue that the first approach places value on local knowledge by reference to its internal coherence and its environmental and sociocultural adaptiveness. In contrast, the second approach strives to demonstrate the primacy of perceptual universals in determining patterns of classification. In so doing, it subjects local knowledge to a test of legitimacy by measuring it against Western systems of classification and downplaying its adaptability to varying environmental demands and cultural dimensions that have shaped, and continue to shape, its many formulations.

The distinction between these two trajectories is not petty, and the problem needs to be discussed because of contemporary concerns about the representation of local knowledge and related issues of authorship, access, and control. These issues inform, or should inform, national, regional, and international negotiations about biodiversity and the commons and about self-determination and intellectual property rights, as well as our understanding of humans-in-environment. Gone are the simpler days when anthropologists could refer to their fieldwork sites as "my village" and speak authoritatively about "my people," or use Western systems of thought as the yardstick for everything that is good and beautiful and true. As Gary Lease (1995:5) perceptively noted:

> In our post-modern, post-Marxist world, class struggles no longer have anything to do with "truth," with "right" and "wrong," but rather only with the most profound level of ideological battles. … Such contests never result in victory, in completion, in closure. We will not "get the story right," regardless of the tendency of some scientists to proclaim final triumph. … Our many representations of nature and human are, in other words, always and ultimately flawed. … This, in turn, underlines the role of *power* in the contestation over what gets to count in any ruling narrative, and who gets to tell it.

There is another, related level in which the debate has been pursued, this time more openly. This concerns the question about whether systems of classification are intellectually driven, a natural pan-human response to being confronted by the chaos (Lévi-Strauss 1966) or the chunks of biological diversity (Berlin, Breedlove, and Raven 1974), or motivated primarily by the utilitarian concerns of human beings as biological entities themselves who need to eat, sleep, keep warm, seek shelter, defend their plots, heal, and reproduce (Hunn 1982). Berlin made his position clear:

> One is not able to look out on the landscape of organic beings and organize them into cultural categories that are, at base, inconsistent with biological reality. The world of nature cannot be viewed as a continuum from which pieces may be selected ad libitum and organized into arbitrary cultural categories. Rather, groups of plants and animals present

themselves to the human observer as a series of discontinuities whose structure and content are seen by all human beings in essentially the same ways, perceptual givens that are largely immune from the variable cultural determinants found in other areas of human experience. (1992:8–9)

As a counterpoint, Hunn's observation about the striking difference between the minimal classificatory effort directed by the Tzeltal to adult butterflies that do not significantly affect their livelihood, and the considerable attention—resulting in more complicated classificatory schemes—they devote to caterpillars that do, indicates that in fact other areas of human experience impact classification in quite significant and interesting ways (Hunn 1982).

Distinct, but in close affinity to the second position, is the emphasis on cultural relations that shape classifications—an argument espoused, for example, by Ellen (1993)—that also questions the disembodied universalist, intellectualist stance. In explaining his position, Ellen wrote:

My own intellectual socialization within the British tradition of social anthropology had brought with it an empirical and sociological bias which militated against an approach which seemed to me to reduce "mundane" classifications to narrow intellectual conundrums to be solved through the application of formal mathematical, logical, and linguistic procedures, or which relegated their analysis to comparative and evolutionary speculation about general mental principles of classification or cognition. … Without denying the importance of these matters, my main theoretical concern has been with classifications as situationally adapted and dynamic devices of practical importance to their users, reflecting an interaction—though in a by no means self-evident way—between culture, psychology, and discontinuities in the concrete world; a lexical and semantic field firmly embedded in a wider context of beliefs and social practices. (1993:3)

My purpose in organizing the conference entitled "Ethnoecology: Different Takes and Emergent Properties," was not to add yet another dissenting voice to this venerable debate. To my mind, the main protagonists in this debate are trying to answer different questions, and, although much has been accomplished in extolling local knowledge and paying respect to its authors, an inordinate amount of energy has already been devoted to arguing for the best possible answer—to "get the story right" once and for all—to sets of questions that are fundamentally different to start with. Berlin has focused his efforts on elucidating universals based on his premise that ethnobiological classification is perceptually driven, while Hunn, Ellen, and others are more concerned with how culture shapes cognition and mediates behavior. There is no reason why human beings cannot operate at both levels sequentially or even simultaneously, as, I think, perhaps they do. In the meantime, we may be missing the opportunity to move on and pursue other interesting directions, to connect intellectually with exciting dialogues within and outside anthropology, and to address real world concerns that are larger than our limited, albeit intense, paradigms.

I believe it is time to reorient the conversation to focus on an important dimension that has largely been missed, a problem with which ethnoecology has great potential for productive engagement, both at the theoretical and at the applied level. I refer to

the connection between plant classification, for example, and conservation of plant genetic resources, or between cultural conceptions of landscape and management of the commons. In short, it is time to turn our attention to the interface between cognition and action—or decision-making frameworks and behavioral outcomes—and the lenses and latitudes that shape and structure these interconnections. We can only begin to tackle this problem, however, if we shift our attention from relations of similarity or paradigmatic alliances captured by our neat but static taxonomic trees to relations of contiguity embracing both syntagmatic and diachronic flow.

In an earlier conceptual paper, Hunn (1989:147) referred to this distinction as the Image vis-à-vis the Plan and noted that while "cognitive anthropologists have made substantial progress in the analysis of cultural Image, of Image domains such as color, kinship relations, folk biological taxonomies, and folk anatomy … what is lacking is an effective integration of our models of Image and of Plan." Such integration would enable us to link categories to strategies and decipher the "action plans" and "activity signatures" (Randall and Hunn 1984) embedded in each category—a crucial step in understanding the role of local knowledge in human-environment interaction. We may also recall that while Conklin applied linguistic analysis to the service of describing spheres of local knowledge or semantic domains, he never lost sight of linkages between cognition, decision making, and action, or the embeddedness of ethnoecological systems in the environmental and cultural matrix. Discussing the importance of the "cultural axis," for instance, Conklin emphasized that:

> Along the cultural axis, three distinctions are noted: technological, social, and ethnoecological. Technological factors refer to the ways in which the environment is artificially modified, including the treatment of crops, soils, pests, etc. In systems of shifting cultivation, these relationships are of primary importance and often exhibit great complexity; … Social factors involve the sociopolitical organization of the farming population in terms of residential, kin, and economic groups. These factors are usually well within the domain of anthropological interest. Ethnoecological factors refer to the ways in which environmental components and their interrelations are categorized and interpreted locally. Failure to cope with this aspect of cultural ecology, to distinguish clearly between native environmental categories (and associated beliefs) and those used by the ethnologist, can lead to confusion, misinformation, and the repetition of useless cliches in discussing unfamiliar systems of land use. (1961:60)

Incorporating contiguity and process as critical components of an engaged ethnoecology also moves us closer to a dynamic rather than monolithic ethnoecology that will admit the importance of ideological negotiation and positioning. No longer encumbered by the need to essentialize our native collaborators, or freeze their taxonomies—or artifacts thereof—in time and space, we can better appreciate how understanding is shaped by standing, as is disposition by position, in an internally differentiated hierarchy of social, economic, and political relations. We can weave into our analysis the history of asymmetric relations with reference to class, gender, and ethnicity, a history that is all too easy to forget if we confine our analysis to perceptual givens, but a history that cannot be finessed because it continues to shape the present. Current thinking in psychology supports the position that even perception is "intelligent"—that it is based on a mental template that incorporates experience and

socialization and makes the interpretation of what is perceived a nonmechanical, nonrandom process (Banks and Krajicek 1991). Since it is impossible to maintain that the formation of our mental templates occurs in a social vacuum, the "programming," in a qualified sense, of perception by constraints imposed by our social niche makes rods-and-cones determinism untenable. D. W. Meinig, a noted geographer, actually preceded the psychologists in articulating this insight:

> It will soon be apparent that even though we gather together and look in the same direction at the same instant, we will not—we cannot—see the same landscape. We may certainly agree that we will see many of the same elements—houses, roads, trees, hills—in such denominations as number, form, dimension, and color but such facts take on meaning only through association; they must be fitted together according to some coherent body of ideas. Thus we confront the central problem: any landscape is comprised not only of what lies before our eyes but what lies inside our heads. (1979:33)

Many individuals in ethnoecology and related disciplines address such questions as these: How are folk (and scientific) models shaped, and for what ends? Who defines niches for different groups? Why do cognitive maps vary? By what processes and means is knowledge "naturalized"? In other words, following Meinig, how does "what lies inside our heads" structure how we see and act upon "what lies before our eyes"? Ethnoecology, as the investigation of systems of perception, cognition, and the use of the natural environment, can no longer ignore the historical and political underpinnings of the representational and directive aspects of culture, nor turn away from issues of distribution, access, and power that shape knowledge systems and the resulting practices. In searching for answers and directions, we are guided by Bourdieu's admonition that the social scientist cannot operate under the illusion that he or she can ever hope to produce "an account of accounts," since: "In reality, agents are both classified and classifiers. But they classify according to (or depending upon) their position within classifications. To sum up what I mean by this, I can comment briefly on the notion of point of view: the point of view is a perspective, a partial, subjective vision. … But it is at the same time a view, a perspective, taken from a point, from a determinate position in an objective social space (1987:2)."

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The New Ecological Anthropology

Conrad P. Kottak

Ecological anthropology was named as such during the 1960s, but it has many ancestors, including Daryll Forde, Alfred Kroeber, and, especially, Julian Steward. Steward's cultural ecology influenced the ecological anthropology of Roy Rappaport and Andrew P. Vayda, but the analytic unit shifted from "culture" to the ecological population, which was seen as using culture as a means (the primary means) of adaptation to environments. Columbia University can be identified as the birthplace of ecological anthropology and the related cultural materialism of Marvin Harris, which, however, drew as much on Steward's concern with culture change (evolution) and culture core as on his cultural ecology. More diachronically and comparatively oriented, cultural materialism shared with ecological anthropology an interest in the adaptive functions of cultural phenomena, including religion (e.g., Rappaport's [1968] focus on ritual in the ecology of a New Guinea people and Harris's [1966, 1974] analysis of the adaptive, conservatory role of the Hindu doctrine of *ahimsa*, with special reference to the cultural ecology of India's sacred cattle).

The ecological anthropology of the 1960s was known for systems theory and negative feedback. Cultural practices were seen as optimizing human adaptation and maintaining undegraded ecosystems. Factors forcing us to rethink old assumptions today include population increase and high-tech-mediated transnational flows of people, commerce, organizations, and information. The new ecological, or environmental, anthropology blends theory with political awareness and policy concerns. It attempts to understand and devise culturally informed solutions to such problems/issues as environmental degradation, environmental racism, and the role of the media, NGOs, and environmental hazards in stimulating ecological awareness and action. While recognizing that local and regional systems are permeable, the new ecological anthropology must be careful not to remove humans and their specific social and cultural forms from the analytic framework.

The following reviews the salient features of the old ecological anthropology, setting the stage for an exploration of important aspects of an emerging new ecological anthropology.

The Old Ecological Anthropology and Its Units of Analysis

The ecological anthropology of the 1960s was known for its functionalism, systems theory, and focus on negative feedback. Anthropologists examined the role of cultural practices and beliefs in enabling human populations to optimize their adaptations to their environments and in maintaining undegraded local and regional ecosystems. Various scholars (for example, Friedman 1974) attacked both ecological anthropology and cultural materialism for a series of presumed faults, including circular reasoning, preoccupation with stability rather than change and simple systems rather than complex ones, and Panglossian functionalism (the assumption that adaptation is optimal—creating the best of all possible worlds). Rappaport's distinction between cognized and operational models was related to ethnoscience, which grew out of linguistics but became another expression of the ecological anthropology of the 1960s. Flourishing at Stanford, Yale, Pennsylvania, and Berkeley, ethnoscience focused on cognized rather than operational models and on classification rather than action, and it received some of the same criticisms just mentioned for ecological anthropology.

The basic units of the ecological anthropology of the 1960s were the ecological population and the ecosystem, treated, at least for analytical purposes, as discrete and isolable units. The comparable unit for ethnoscience was the ethnosemantic domain (for example, ethnobotany, ethnozoology, ethnoforestry). Assumptions of the old ecological anthropology, now clearly problematic, are apparent in some of its key definitions—most importantly ecological population and ecosystem.

Rappaport defines an ecological population as "an aggregate of organisms having in common a set of distinctive means by which they maintain a common set of material relations within the ecosystem in which they participate" (1971a:238). Several elements of this definition must now be questioned. Given contemporary flows of people, information, and technology across cultural and social boundaries, how *distinctive* are the cultural adaptive means employed by any group? Given the fact and recognition of increased diversity within populations, how *common* is the set of material relations within ecosystems? Nor do most people today participate in only one ecosystem.

The New Ecological Anthropology

The differences between the old and the new ecological anthropology involve policy and value orientation, application, analytic unit, scale, and method. The studies in the old ecological anthropology pointed out that natives did a reasonable job of managing their resources and preserving their ecosystems (albeit through some rather unsavory means, including mortal combat and female infanticide); but those studies, relying on the norm of cultural relativism, generally aimed at being value-neutral. By contrast, the new ecological, or environmental, anthropology blends theory and analysis with political awareness and policy concerns. Accordingly, new subfields have emerged, such as applied ecological anthropology and political ecology (Greenberg and Park 1994).

We cannot be neutral scientists studying cognized and operational models of the environment and the role of humans in regulating its use when local communities and ecosystems are increasingly endangered by external agents. Many anthropologists have witnessed personally a threat to the people they study—commercial logging, environmental pollution, radioactivity, environmental racism and classism, ecocide, and the imposition of culturally insensitive external management systems on local ecosystems that the native inhabitants have managed adequately for centuries. Today's world is full of neocolonial actions and attitudes; outsiders claim or seize control over local ecosystems, taking actions that long-term residents may disdain. Concerned with proposing and evaluating policy, the new environmental anthropology attempts not only to understand but also to devise culturally informed and appropriate solutions to such problems and issues as environmental degradation, environmental racism, and the role of the media, NGOs, and various kinds of hazards in triggering ecological awareness, action, and sustainability.

The changes in ecological anthropology mirror more general changes in anthropology: the shift from research focusing on a single community or "culture," perceived as more or less isolated and unique, to recognizing pervasive linkages and concomitant flows of people, technology, images, and information, and to acknowledging the impact of differential power and status in the postmodern world on local entities. In the new ecological anthropology, everything is on a larger scale. The focus is no longer mainly the local ecosystem. The "outsiders" who impinge on local and regional ecosystems become key players in the analysis, as contact with external agents and agencies (for example, migrants, refugees, warriors, tourists, developers) has become commonplace. Ecological anthropologists must pay attention to the external organizations and forces (for example, governments, NGOs, businesses) now laying claim to local and regional ecosystems throughout the world. Even in remote places, ecosystem management now involves multiple levels.

Issues for the New Ecological Anthropology

One firm conclusion of the old ecological anthropology in all its guises (for example, the "ecological anthropology" of Rappaport and Vayda, the "cultural materialism" of Harris, and the "ethnoscience" of Berlin, Conklin, Frake, and Goodenough) was that indigenous groups have traditional ways of categorizing resources, regulating their use, and preserving the environment. An *ethnoecology* is any society's traditional set of environmental perceptions—that is, its cultural model of the environment and its relation to people and society. Today's world features a degree of political and economic interconnectedness unparalleled in global history. Local ethnoecologies are being challenged, transformed, and replaced. Migration, media, and industry spread people, institutions, values, and technologies. Imported values and practices often conflict with those of natives. In the context of population growth, migration, commercial expansion, and national and international incentives to degrade the environment, ethnoecological systems that have preserved local and regional environments for centuries are increasingly ineffective.

Ethnoecological Clashes: Developmentalism and Environmentalism. Challenging traditional ethnoecologies are two, originally Euro-American, ethnoecologies: developmentalism and environmentalism (Kottak and Costa 1993). These models enter myriad cultural settings, each of which has been shaped by particular national, regional, and local forces. Because different host communities have different histories and traditions, the impact of external forces is not universal or unidirectional. The spread of either developmentalism or environmentalism is always influenced by national, regional, and local ethnoecologies and their powers of adaptation and resistance.

Environmentalism entails a political and social concern with the depletion of natural resources (Bramwell 1989:3–6; Douglas and Wildavsky 1982:10–16). This concern has arisen with, and in opposition to, the expansion of a cultural model (developmentalism) shaped by the ideals of industrialism, progress, and (over)consumption (Barbour 1973; Pepper 1984). Environmental awareness is rising today as local groups adapt to new circumstances and to the models of developmentalism and environmentalism. Hazards created by development have been necessary conditions for the emergence of new perceptions of the environment. Environmental safeguards and conservation of scarce resources are important goals—from global, national, long-run, and even local perspectives. Still, ameliorative strategies must be implemented in the short run and in local communities. If traditional resources and products are to be destroyed, removed, or placed off limits (whether for development or conservation), they need to be replaced with culturally appropriate and satisfactory alternatives.

A new, possibly mediating, ethnoecological model—*sustainable development*—has emerged from recent encounters between local ethnoecologies and imported ethnoecologies, responding to changing circumstances. Sustainable development aims at culturally appropriate, ecologically sensitive, self-regenerating change. It thus mediates between the three models just discussed: traditional local ethnoecology, environmentalism, and developmentalism. "Sustainability" has become a mantra in the discourse surrounding the planning of conservation and development projects, but clear cases of successful sustainable development are few.

Issues addressed by the new ecological anthropology arise at the intersection of global, national, regional, and local systems, in a world characterized not only by clashing cultural models but also by failed states, regional wars, and increasing lawlessness. Local people, their landscapes, their ideas, their values, and their traditional management systems are being attacked from all sides. Outsiders attempt to remake native landscapes and cultures in their own image. The aim of many agricultural development projects, for example, seems to be to make the world as much like Iowa as possible, complete with mechanized farming and nuclear family ownership—despite the fact that these models may be inappropriate in settings outside the midwestern United States. Development projects often fail when they try to replace native forms with culturally alien property concepts and productive units (Kottak 1990).

A clash of cultures related to environmental change may occur when development threatens indigenous peoples and their environments. Native groups like the Kayapó of Brazil may be threatened by regional, national, and international development plans (such as a dam or commercially driven deforestation) that would destroy their homelands. A second clash of cultures related to environmental change occurs when

external regulation threatens indigenous peoples. Thus, native groups, such as the Tanosy of southeastern Madagascar, may be harmed by regional, national, and international environmental plans that seek to *save* their homelands. Sometimes outsiders expect local people to give up many of their customary economic and cultural activities without clear substitutes, alternatives, or incentives.

Consider the case of a Tanosy man living on the edge of the Andohahela reserve of southeastern Madagascar. For years he has relied on rice fields and grazing land inside the reserve. Now external agencies are telling him to abandon this land for the sake of conservation. This man is a wealthy *ombiasa* (traditional sorcerer-healer). With four wives, a dozen children, and twenty head of cattle, he is an ambitious, hard-working, and productive peasant. With money, social support, and supernatural authority, he is mounting effective resistance against the park ranger who has been trying to get him to abandon his fields. The ombiasa claims he has already relinquished some of his fields, but he is waiting for compensatory land. His most effective resistance has been supernatural. The death of the ranger's young son was attributed to the ombiasa's magical power. After that the ranger was less vigilant in his enforcement efforts.

Biodiversity Conservation. Biodiversity conservation has become an issue in political ecology, one of the subfields of the new ecological anthropology. Such conservation schemes may expose very different notions about the "rights" and value of plants and animals versus those of humans. In Madagascar, many intellectuals and officials are bothered that foreigners seem more concerned about lemurs and other endangered species than about Madagascar's people. As one colleague there remarked, "The next time you come to Madagascar, there'll be no more Malagasy. All the people will have starved to death, and a lemur will have to meet you at the airport."

On the other hand, accepting the idea that preserving global biodiversity is a worthwhile goal, one vexing role for applied ecological anthropology is to devise socially sensitive and culturally appropriate strategies for achieving biodiversity conservation—in the face of unrelenting population growth and commercial expansion. How does one get local people to support biodiversity conservation measures that may, in the short run at least, diminish their access to strategic and socially valued resources?

I am one of several anthropologists who have done social-soundness analysis for conservation and development projects. Such projects aim, in theory at least, at preserving natural resources and biodiversity while promoting human welfare through "development." My experience designing the social-soundness component of the SAVEM project (Sustainable and Viable Environmental Management), intended to preserve biodiversity in Madagascar, suggested that a gradual, sensitive, and site-specific strategy is most likely to succeed (Kottak 1990; Kottak and Costa 1993). Conservation policy can benefit from use of a flexible "learning process" model rather than a rigid "blueprint" strategy (Korten 1980; see also Kottak 1990). The approach I recommended for Madagascar involves listening to the affected people throughout the whole process in order to minimize damage to them. Local people (with at least some secondary education) were trained as "para-anthropologists" to monitor closely the perceptions and reactions of the indigenous people during the changes.

Ecological Awareness and Environmental Risk Perception. The "applied" ("engaged" in Rappaport's [1994] terms) role of today's ecological anthropologist may be as agent or advocate—planner and agent of policies aimed at environmental preservation or amelioration—or advocate for local people actually or potentially at risk through various forces and movements, including developmentalism and environmentalism. One research-and-development role for today's ecological anthropologist is to assess the extent and nature of ecological awareness and activity in various groups and to harness parts of native ethnoecological models to enhance environmental preservation and amelioration.

With Brazilian colleagues Alberto Costa and Rosane Prado, I have researched environmental risk perception and its relation to action at several sites in Brazil (Costa et al. 1995; Kottak and Costa 1993). Our assumption has been that, although people won't act to preserve the environment if they perceive no threats to it, risk perception does not guarantee action. Our research sought answers to several questions: How aware are people of environmental hazards? How do, can, and will they respond to them? Why do some people ignore evident hazards while other people respond to minor dangers with strong fears? How is risk *perception* related to *actions* that can reduce threats to the environment and to health? (For an American take on such questions, see Kempton et al. 1995.)

A key assumption underlying our Brazilian research is as follows: although the presence of an actual hazard increases risk perception, such perception does not arise inevitably through rational cost-benefit analysis of risk. Instead, risk perception emerges (or lags) in cultural, political, and economic contexts shaped by encounters among local ethnoecologies, imported ethnoecologies (often spread by the media), and changing circumstances (including population growth, migration, and industrial expansion).

Environmental awareness was especially evident in Brazil immediately before and after the Earth Summit or UNCED (the United Nations Conference on the Environment and Development), held in Rio de Janeiro in June 1992. Ecological awareness has been abetted by the media, particularly television—to which Brazil is well-exposed, with the world's most watched commercial television network, Globo. Brazilian environmentalism began to grow in the mid-1980s, reflecting the return of public debate along with democracy—*abertura*, the Brazilian *glasnost*, after two decades of military rule. Brazilian environmentalism, strongest in cities in the southcentral part of the country, is a growing political force, but with mainly urban support.

There is much less ecological awareness outside the main cities. A simple illustration comes from my own research in Arembepe (Bahia state), an Atlantic fishing town I have been studying since 1962 (Kottak 1999). Since the early 1970s, Arembepe has suffered air and water pollution from a nearby multinationally owned titanium dioxide factory. In three decades, Arembepe's municipal seat, Camaçari, has grown tenfold, from a sleepy rural town into a major industrial (petrochemical) center. Chemical pollution of the region's streams, rivers, and coastal waters now endangers wildlife and people.

Like others in their municipality, Arembepeiros face real and immediate hazards—industrial pollution of the air, fresh water, and the ocean. Several times, reporters

from the nearby metropolis of Salvador have covered the chemical pollution of Arembepe's coastal water and freshwater lagoons. Most villagers have seen those reports on TV. Still, local awareness of immediate environmental threats hasn't increased as rapidly as the hazards have. Thus, walking along the beach north of Arembepe one day in 1985, I passed dead sea gulls every few yards. There were hundreds of birds in all. I watched the birds glide feebly to the beach, where they set down and soon died. I was stunned and curious, but local people paid little attention to this matter. When I asked for explanations, people said simply "the birds are sick." Neither Arembepeiros nor scientists I spoke with in Salvador (who speculated about an oil spill or mercury poisoning) could provide a definitive explanation for the dead birds.

Although Brazilian environmental awareness has grown, media accounts have followed the international lead by focusing on the Amazon as *the* ecologically threatened region. Community-level data we have collected at several sites show that Amazonian deforestation is the nonlocal ecological issue most familiar to ordinary Brazilians. When they are asked about "ecology," most Brazilians mention the Amazon instead of hazards closer to home. But environmental threats with global implications (including deforestation) exist in many areas of Brazil besides the Amazon.

My research in Brazil and Madagascar convinces me that people won't act to preserve the environment (regardless of what environmentalists and policymakers tell them to do) if they perceive no threat to it. They must also have some good reason (for example, preserving irrigation water or a tax incentive) for taking action to reduce the environmental threat. They also need the means and the power to do so. Risk perception per se does not guarantee environmental organization and action.

NGOs and Rights Movements. The worldwide proliferation of nongovernmental organizations is a major trend in late-twentieth-century political organization. This proliferation merits the attention of the new ecological anthropology because so many NGOs have arisen around environmental and "rights" issues. Over the past decade, the allocation of international aid for "development" (including conservation as well as development) has systematically increased the share of funds awarded to NGOs, which have gained prominence as social change enablers.

In the "development community" (for example, the World Bank, USAID, UNDP [United Nations Development Programme]), it is widely assumed that a strategy of channeling funds to NGOs, PVOs (private voluntary organizations), and GROs (grass roots organizations) will maximize immediate benefits to community residents. NGOs are generally viewed as more responsive to local wishes and more effective in encouraging community participation than are authoritarian and totalitarian governments. However, this strategy is being increasingly criticized, especially in cases (for example, Madagascar) in which powerful, expatriate-staffed international NGOs are allowed to encroach on the regulatory authority of existing governments. There is a real issue of neocolonialism when it is assumed that NGOs with headquarters in Europe or North America are better representatives of the people than are their own elected governments, although certainly they may be.

The emergence and international spread of "rights" movements (human, cultural, animal) is also of interest to ecological anthropology. The idea of human rights

challenges the nation-state by invoking a realm of justice and morality beyond and superior to particular countries, cultures, and religions. Human rights are seen as inalienable (nation-states cannot abridge or terminate them) and metacultural (larger than and superior to individual nation-states). Cultural rights, on the other hand, apply to units *within* the state. Cultural rights are vested not in individuals but in identifiable groups, such as religious and ethnic minorities and indigenous societies. Cultural rights include a group's ability to preserve its culture, to raise its children in the ways of its forebears, to continue its language, and not to be deprived of its economic base (Greaves 1995:3). Greaves (1995) points out that because cultural rights are mainly uncodified, their realization must rely on the same mechanisms that create them—pressure, publicity, and politics. Such rights have been pushed by a wave of political assertiveness throughout the world, in which the media and NGOs have played a prominent part.

The notion of indigenous intellectual property rights (IPR) has arisen in an attempt to conserve each society's cultural base—its core beliefs and principles, including its ethnoecology. IPR is claimed as a group right—a cultural right, allowing indigenous groups to control who may know and use their collective knowledge and its applications. Much traditional cultural knowledge has commercial value. Examples include ethnomedicine (traditional medical knowledge and techniques), cosmetics, cultivated plants, foods, folklore, arts, crafts, songs, dances, costumes, and rituals. According to the IPR concept, a particular group may determine how indigenous knowledge and its products may be used and distributed and the level of compensation required.

Environmental Racism. The issues of interest to the new ecological anthropology are myriad, but a final one may be mentioned: environmental racism. This is a form of institutional discrimination in which programs, policies, and institutional arrangements deny equal rights and opportunities to, or differentially harm, members of particular groups. Bunyan Bryant and Paul Mohai define environmental racism as "the systematic use of institutionally-based power by whites to formulate policy decisions that will lead to the disproportionate burden of environmental hazards in minority communities" (1991:4). Thus, toxic waste dumps tend to be located in areas with nonwhite populations.

Environmental racism is discriminatory but not always intentional. Sometimes toxic wastes *are* deliberately dumped in areas the residents of which are considered unlikely to protest (because they are poor, powerless, "disorganized," or "uneducated"). (This is why a polluting titanium dioxide factory was placed near my Brazilian field site of Arembepe rather than in an area having more political clout [see Kottak 1999].) In other cases property values fall after toxic waste sites are located in an area. The wealthier people move out, and poorer people, often minorities, move in, to suffer the consequences of living in a hazardous environment.

Methodology in the New Ecological Anthropology

The new ecological anthropology can draw on a series of high-tech research methods. Satellite imagery (deployed synchronically or diachronically) has been used to locate ecological hotspots (e.g., areas of deforestation or pollution), which have then been investigated on the ground by multidisciplinary teams (see Green and Sussman 1990; Kottak et al. 1994; Sussman et al. 1994). GIS (geographical information systems) and other approaches may be used to map various kinds of data on human and environmental features (see Sponsel et al. 1994). Macroscope software, developed by J. Stephen Lansing and others, facilitates the mapping—on a computer screen—of various kinds of information, such as yields in Balinese fields in relation to pest damage and farming practices. Survey data can be collected across space and time and compared. However, the availability of such high-tech methods should not seduce us away from anthropology's characteristic focus on people. Ethnographic research in varied locales helps us discover relevant questions, which some of the techniques just mentioned can help us answer. The new ecological anthropology can use high-tech methods, while taking care not to let electronic dazzle divert attention from direct, firsthand ethnographic study of people and their lives.

Also relevant to the new ecological anthropology is linkages methodology, as elaborated by Kottak and Colson (1994). As Elizabeth Colson and I have pointed out, anthropologists are increasingly developing models of their subject matter that are isomorphic with the structure of the modern world, including the various regional, national, and international linkages within it. We use the term *linkages methodology* to describe various recent multilevel, multisite, multitime research projects. A definition of linkages in relation to research methodology and content was the goal of a working group of anthropologists who first met in 1986.[1] All of us were concerned with the impact of international and national forces, including development projects, on our research locales. Most members of the Linkages Group (as we called ourselves) had worked more than once in the same region. We knew the advantages of observing how people respond to different opportunities and perturbations at various stages of their lives.

We recognized the value of research samples (both communities and mobile individuals) that could be followed through time. What kinds of links did they have with others, including external agencies? This line of inquiry entailed a census approach, a network approach (to trace relationships associated with geographical mobility and external interventions), plus survey and ethnographic techniques. The linkages approach to change also required attention to the roles of governmental and nongovernmental organizations, and of changes in marketing, transportation, and communication systems.

One method of linkages research is to study a site or sites over time. Another is systematic intercommunity comparison, requiring multiple sites that are chosen because they vary with respect to key criteria. These sites can be drawn from the same region, and the data collected would be part of the same study. They can also be from different regions (even different countries), if anthropologists can provide minimum core data (Epstein 1978:220) to make comparison possible. Linkages research extends to the

levels at which policies are worked out, examining archives and official records and interviewing planners, administrators, and others who impinge on the study population(s). The aim of linkages methodology is to link changes at the local level to those in regional, national, and world systems.

Linkages research is planned as an ongoing process requiring teamwork. Time and personnel are needed to follow a dispersing population, to study different sites, to interview at many levels, to explore archives and records, and to do follow-up studies. Involvement of host country colleagues, including local assistants and other community residents, is a key to continuity. Thus, *linkages* also refers to cooperation by people with common research interests in the effort to generate a fund of data.

One example of linkages methodology is the research I directed in Brazil on industrialization and commercial expansion, focusing on environmental hazards and risk perception. The investigation proceeded at two levels: (1) national—Brazil as a whole, where the government introduced a policy of industrialization in the early 1950s, and (2) local—across a range of sites differently exposed to risks (Costa et al. 1995; Kottak and Costa 1993). The field research design was systematic intercommunity comparison (based on quantitative and qualitative data). This methodology adds an analytic level to traditional "risk analysis," which studies populations *directly exposed* to environmental hazards like nuclear repositories. Given *that* research design, public reactions to a threat are inevitably interpreted within a stimulus-response framework (a threat causes certain responses). By contrast, our design assumed that variation in environmental awareness and risk perception could be most accurately understood by studying a range of sites differentially exposed to hazards. Comparison is essential. Any approach limited to endangered groups can't help but see risk perception mainly in response to an immediate stimulus. (For other linkages projects, see Kottak and Colson 1994.)

The linkages approach agrees with world system theory that much of what goes on in the world today is beyond anthropology's established conceptual and methodological tools. Traditional ethnography, based on village interviews and participant-observation, assumed that informants knew what was going on in that delimited space. Today, however, no set of informants can supply all the information we seek. Local people may not be helpless victims of the world system, but they cannot fully understand all the relationships and processes affecting them.

Not just the old ecological anthropology but traditional ethnography in general also propagated the illusion of isolated, independent, pristine groups. By contrast, the linkages approach emphasizes the embeddedness of communities in multiple systems of different scale. Linkages research combines multilevel (international, national, regional, local) analysis, systematic comparison, and longitudinal study (using modern information technology). Challenging the tradition of the lone ethnographer, linkages methodology develops large-scale, explicitly comparative *team projects* (ideally involving international research collaboration).

In Conclusion—Romer's Rule

The paleontologist A. S. Romer (1960) developed the rule that now bears his name to explain the evolution of land-dwelling vertebrates from fish. The ancestors of land animals lived in pools of water that dried up seasonally. Fins evolved into legs to enable those animals to get back to water when particular pools dried up. Thus, an innovation (legs) that later proved essential to land life originated to maintain life in the water. Romer's lesson—important for both the old and the new ecological anthropology—is that an innovation that evolves to *maintain* a system can play a major role in *changing* that system. Evolution occurs in increments. Systems take a series of small steps to maintain themselves, and they gradually change. Rappaport recognized Romer's lesson in his definition of adaptation: "the processes by which organisms or groups of organisms maintain *homeostasis* in and among themselves in the face of both short-term environmental fluctuations and long-term changes in the composition and structure of their environments" (Rappaport 1971b:23–24, emphasis added).

Romer's rule can be applied to development, which, after all, is a process of (planned) socioeconomic evolution. Applying Romer's rule to development, and here especially to ecologically oriented initiatives, we would expect people to resist projects that require major changes in their daily lives, especially ones that interfere with subsistence pursuits. People usually want to change just enough to keep what they have. Motives for modifying behavior come from the traditional culture and the small concerns of ordinary life. Peasants' values are not such abstract ones as "learning a better way," "increasing technical know-how," "conserving biodiversity," or "making the world safe for democracy." (Those phrases exemplify intervention philosophy.) Instead, their objectives are down-to-earth and specific ones. People want to improve yields in a rice field, amass resources for a ceremony, get a child through school, or be able to pay taxes. The goals and values of subsistence producers may at times differ from those of people who produce for cash, just as they differ from the intervention philosophy of development planners. Different value systems must be considered during planning.

This is one more way of saying that (ecological) anthropologists should not forget culture and people as they grapple with complexity, comparison, and change. Change always proceeds in the face of prior structures (a given sociocultural heritage). The direction and nature of change is always affected by the organizational material (sociocultural patterns) at hand when the change begins. Thus, cultural ways cannot be regarded as blank checks on which the environment, or history, can freely and mechanically write.

NOTES

1. This perspective was formalized at two Wenner-Gren supported conferences organized by Douglas White and held in La Jolla, California, in 1986. Participants, who became founding members of Linkages: The World Development Research Council, included Lilyan Brudner-White, Michael Burton, Elizabeth Colson, Scarlett Epstein, Nancie Gonzalez, David Gregory, Conrad Kottak, Thayer Scudder, and Douglas White.

Linkages' goals include assisting in organizing and coordinating basic scientific research on development on a worldwide basis. This includes formulation of theory, testing of hypotheses, development of appropriate databanks for testing theoretical formulations, monitoring change, establishing trends, and identifying specific linkages or mechanisms involved in social change, including development interventions.

A crucial vehicle for development research, including study of both spontaneous and planned social change, is the systematic integration of data from longitudinal field sites. Such sites allow analysis and evaluation of long-term trends and effects, including cyclical changes relating to human populations and their ecologies, including the ecology of world systems and networks.

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Normative Behavior

I. G. Simmons

Concerns and Principles

The first questions which ethicists and philosophers find it necessary to tackle seem to be (a) can we talk of environmental ethics at all? and (b) is it possible to talk in the aggregate or must there be a break-down into subsets of concern?[1] Some begin with an **ontological** argument[2] which takes the form of asserting that it is the duty of humans to promote or preserve the existence of good. The environment, whether as beauty or resources, is part of that good and its existence is physically contingent upon the continued existence of its components and its history, neither of which humans ought to disrupt.[3]

Further consideration reveals that there are (at least) two possible meanings of 'environmental ethics' to be discussed. They are:

1. The idea of an ethic for the **use of the environment**, i.e. a position which starts empirically from where we are, accepting the dominant world-view that the Earth is a set of resources which humanity is free to employ, even if some of them are employed in their entirety as aesthetic and recreational resources rather than simply as materials. The words 'utilitarian' and 'instrumental' are often used of such an attitude.

2. The idea of an ethic **of the environment** in which the moral standing of the non-human entities of the cosmos are given equal value with the human species. There is a 'weak' version in which at the very least this standing must be extended to all conscious beings and some non-conscious entities as well.

The first of these is well established and can be encapsulated by the term 'wise use'; the science of ecology has been harnessed since the 1960s as a hitching-rail for a management ethic for the human use of the Earth.[4] But another abstract element in the area management ethics must be our duty to future generations of humans. As yet unborn, they have no voice in our current preoccupations.[5] Normative behaviour, then, addresses itself to how much we should worry about the welfare of those to

come: should we refrain from using non-renewable resources (like fossil fuels) now so that this patrimony is not denied to our descendants? Or would we benefit later generations most by turning all these resources into knowledge of how to do without them?

The second viewpoint is the more difficult in both abstract and practical terms. The idea of intrinsic or inherent goodness (and hence of moral equality with humans) has rested primarily upon the presence of value independent of the presence of any conscious being: the value resides in the object itself and is not conferred upon it from 'outside', rather in the manner of an Honorary Degree.[6] For humans, then, the fitting attitude is one of admiring respect coupled with the realisation that the environment is not merely a means to human ends. The espousal of such an attitude would not have seemed strange in the Middle Ages, but has been largely submerged or dissolved since the Renaissance and the Enlightenment by the narrow focus of humans upon humans.

The current notion of inherent value assumes, however, the kind of distinction between subject and object that we associate with René Descartes. But one of the major consequences of the findings of quantum mechanics during the twentieth century has been that such a differentiation cannot be made. At the fundamentals of matter, what can be said about a particle in terms of its velocity and location are to some degree chosen for it by the observer: she or he may choose to know the particle's position definitely *or* its velocity definitely or both approximately. Location and velocity are, as Callicott puts it,[7] potential properties of an electron variously actualised in different experiments. Any attribution of value, therefore, has to be focused on neither the subjective nor the objective: if categories are needed, they must transcend the old dichotomies. Further, it can be argued that the universe consists of just one substance— spacetime—which is 'self-realising', and which must therefore be an ultimate source of value.[8] Above the underground rings of the particulate world, the extension of such ideas means perhaps that the essential unit of the world is the identification between self and world; the human self is a temporary knot in a web of life and non-life, rather as a particle seems to be a temporary manifestation of energy. So nature is intrinsically valuable to the same extent that the self is valuable.

None of these sets of ideas is without its critics. At one level, it can be argued that the aesthetics which, for example, motivate much environmental concern are not as fundamentally human as eating and drinking. Further, environmentalism can be seen as an ideological descendant of the Romanticism of the early nineteenth century and so is likely to be identified with reactionary politics.[9] This concern with political interpretations can be carried deeper into the structure of the language we use. For example, it may be that landscapes and species to which we attach value are expressions of cultural values: in North America, 'the wilderness' is said to be a repository of male and nationalistic traits. Even further, it is said that the current arguments about environmental ethics are incoherent because they use terms that only make sense in a system which has an agreed concept of human purpose and direction, a *telos*.[10] At present, such terms as rights, interests, utility and duty are all disguises for a determination to hold on to power. So the concept of rights (if it is to flow from a determination of intrinsic worth, for instance) is merely a fiction hovering above

reality. It may, of course, be a useful fiction for promoting change in human behaviour but it carries some other possibilities for abandoning the debate over environmental ethics since environmental 'problems' can be seen as social problems, to be solved by social action, with appropriate contributions from existing social and political philosophies.

In initial summary, therefore, the main foci of discussion in environmental philosophy and ethics at present seem to be:

- must an environmental ethic be based on human values, interests and goods or the corresponding features of the non-human world?
- does non-human nature have value in itself (i.e. intrinsic value) or only as a source of satisfaction of human wants (i.e. instrumental value)?
- can moral concern be directed only towards individuals or can it be directed towards groups or categories such as ecological communities and ecosystems?

The attempt to develop a different relationship with the non-human world, on paper and in practice, is gathering pace rather than abating, so we shall have to see in a little more detail some of the ways in which it is developing.

Pragmatics

To illustrate one practical outgrowth of ethical thinking about the environment, consider the 'lifeboat ethics' associated with the North American biologist Garrett Hardin.[11] Looking at resource availability in the future and at population growth rates, Hardin likens the situation to a series of lifeboats. The rich countries are like boats with a moderate number of passengers on board, the poor countries are like overcrowded vessels. The poor continuously fall out of their boat and hope to be admitted to one of the less crowded boats. According to classical Christian or Marxist ethics, says Hardin, everybody should be allowed aboard. This would lead to complete justice and equally complete catastrophe. Hardin argues that to help the poor at all (via technology transfers or food aid programmes, for example) is to diminish the safety margin for the wealthy and to reduce the choices for future generations. The stark impact of this outlook is somewhat modified by Ehrlich's 'triage' proposals, in which some selected individuals would be helped, following the practice of battlefield military medicine.[12] In this, casualties are divided into three categories: those who will die no matter what is done for them; those who will live even if treatment is delayed; and those for whom treatment makes the difference between life and death. These latter might be admitted to the lifeboats. Both these proposals attracted the realistic and the hard-headed among international development and financial agencies, just as they have evoked opprobrium from those who see the ideas as 'anti-people', from those who argue that justice ought to be maximised before general well-being, that our duties to the present generation outweigh those to future generations and that democratic decision-making would produce a different set of outcomes. Whatever one's views of these proposals, they have a directness of approach not characteristic of all ethical discussion.[13]

To translate even utilitarian approaches into principles of normative behaviour is problematical. It is not simple to find a way of dealing with something as diverse as our own individual behaviour today (shall I go outside in the rain to the compost heap with the potato peelings or put them in with the wastes that go to the municipal tip?) all the way to the whole of humankind tomorrow (how many of them will there be, ought there to be, and to what quantity of resources should each person have access?). Much current action seems to be based on the cost-benefit ratio as an instrument.[14] This is an imperfect technique and says, for example, very little about the distribution of the happiness and good which may be achieved; it also says nothing about any future that cannot be programmed in terms of discount rates. Yet such is the predominance of the western world-view that it has eclipsed most other value systems as a way of re-ordering the world. Students of ethics, however, can at least point to other choices that could be made, both by individuals and more especially by societies. It should be possible to bias decisions against arbitrary choices based on random or temporary factors or whims of powerful individuals; to bias decision-making towards those humans and non-humans who are especially vulnerable to change; to decide always in favour of the sustainable benefit rather than the one-off haul; and always to move against causing harm as distinct from merely foregoing benefits.

The Non-Human World

Although in our anthropocentric way we calmly categorise the rest of the planet as the non-human world, this does not mean that we are released from concern about it. In general, though, there has been a hierarchy of attention based on the degree of similarity between ourselves and the other components of the system: other mammals get the most intensive treatment, then other animals, and thereafter plants, the soil and inanimate things. Of late, the whole biosphere in a functional sense has also commanded the regard of writers on ethics.[15]

Our knowledge of the nature of animals is still accumulating but the more we have, the more it seems true that there are more continuities of biology and behaviour than have in general been recognised.[16] The recognition of an evolutionary continuum between humans and other species seems fundamental to the kinds of judgements we are apt to make about other species of animals. This was not always so: in the West there has been a long tradition of regarding animals as outside the moral universe.[17] Some of this, in e.g. the seventeenth and eighteenth centuries, was largely verbal as philosophers tried to refine the terms of debate, so that their refusal to grant moral standing to animals in the pages of their books was somewhat offset by their love of their dogs or their care over replacing caterpillars on trees. Other parts of it were more practical: St Augustine took over the Stoic tradition of refusing to grant animals any moral consideration and this Christian tradition was kept up by, for example, Pope Pius IX (pontificate 1846–1878) who refused, on those identical grounds, to allow the setting up of a Vatican branch of the Society for the Prevention of Cruelty to Animals. Away from such centres of sensitivity, European colonists killed the native humans and the native fauna with equal facility when they felt like it, and many do

not now shrink from the rapid dispatch of spiders in the bath-tub although we may prefer to have lambs made into chops somewhere well out of sight, sound and smell.

One of the turning points in the development of a new sensitivity was epitomised by Jeremy Bentham (1748–1832) who pointed out the essential contiguity of humans and other animals when he argued that the question was not 'can they reason?', nor 'can they talk?' (neither of which can be said of human babies), but 'can they suffer?'. Within that framework, lower animals were held not to be able to suffer, however. In industrialising countries, the social reforms of the late nineteenth century usually included animals, either by prohibiting cruelty or trying to protect wild creatures, or both. The reasons for this greater sensitivity to the fate of animals have been elaborated by many writers and no one argument seems to be pre-eminent.

First of all, there are the feelings experienced by humans for animals. These need no elaboration except to say that they are easily dismissed by the severely rational as being 'mere emotion'. But as Mary Midgley argues so cogently,[18] they are a necessary part of any moral universe, though not sufficient in themselves as the basis of an ethical code. They are, of course, likely to be socially and culturally relative but that does not invalidate the feelings of those who have them. But even in societies with highly developed feelings towards dogs,[19] for example, the use of experimental animals to test cosmetics is still allowed. Moving towards a more objective approach,[20] there is the value (potential if not actual) to us of a species as a resource: for food perhaps or like the nine-banded armadillo which is the only other animal that can catch leprosy and therefore is a test-bed for treatments. And at a slightly further distance towards intellectual and scientific argument, there is the value of biological diversity as material for evolution.

But beyond these ideas which stem from human-centred concerns (which are sometimes labelled 'subjective values' or 'instrumentalist values'[21]) is the proposition that animals have a good all of their own which is completely external to human purposes, i.e. they have intrinsic value. In most people's reckoning this gives them moral standing but not, it appears, equal moral significance in case of conflict. Nevertheless there are those who argue for the equality of all species, whereas others will say that there is a difference between sentient beings and non-sentient ones, with a line being drawn somewhere above the bacteria and viruses. The discussion is carried further by the protagonists of animal rights.[22] They aver that animals have every right to as much moral consideration as have humans and that such standing should be encapsulated in law to the same extent as human rights are thus (somewhat variably) enshrined. Opponents of that view rest their case on the impossibility of animals having interests in the philosophical sense and on their being unable to fulfil the reciprocal obligations which are an essential part of the granting of rights. Instrumentally minded writers are worried that full-scale granting of intrinsic rights to animals would make it impossible for humans to go on living in anything like the ways to which we have become accustomed: we cannot all become Jainists, it is supposed.[23]

Many of the animal-related arguments also apply to other parts of the biosphere and some even to the atmosphere and the rest of the cosmos as well. Plants are the obvious next step, and the larger ones such as trees attract most attention,[24] performing a function analogous to mammals in the zoological realm. Beyond them is the

question as to whether the biosphere as a functional whole has a moral standing. Those in favour point to the interconnectedness of everything: without it, they say,[25] humans would not exist let alone have the energy to argue about the future of the Indian Tiger. So there is no real barrier between an individual and the rest of the cosmos and even less so between us and say the plants of this planet.[26] Those against point once more to the ideas of interest and obligation which are inherent in the concept of rights and standing and which the biosphere cannot possess, being non-sentient. By extension, also, not every relationship of interdependence also carries with it a moral bond. Nevertheless our consequent behaviour might have to go no further than Immanuel Kant (1724–1804) who said that we should act as if our maxims had to serve at the same time as a universal law for all the entities that make up the world. 'Think globally, act locally' is today's Green version of the same thing.

Current Western Ethical Systems

We turn now to comprehensive systems of normative behaviour, which lay down principles for the treatment of the environment in its totality. Some systems are extensions of those which deal with people or animals; others are especially formulated in the light of our knowledge of the holistic nature of our environment and our place within it. We consider first those which are ecology-based. These have grown out of the findings of ecology as a science but are now transscientific in nature, having added values and moral imperatives to the original science. Second, we look at those which are theology-based, which in western terms means mainly Judaism and Christianity. Then there is a short section on ethics which derive from radical examinations of our constructions of the world via language, as with Heidegger. Lastly, the question of metaphysics is examined for its relevance to any ethics of the environment.

Aldo Leopold was an academic zoologist with deep roots in the rural landscapes of the USA. He became convinced as early as the 1930s that the emerging science of ecology showed ways of relating to nature that would avoid disasters like those of the Dust Bowl. Leopold argued for the development of an 'ecological conscience', to be elaborated into a 'land ethic' that understood the basic nature of the biosphere.[27] The ethic rests on the principle that an individual organism (humans included) is a member of a community of interdependent parts, with no rights to opt out. For Leopold, a process was right when it tended to preserve the integrity, stability and beauty of the biotic community, and contemporary land economics did no such thing, for land, like Odysseus' slave girls,[28] was still property. More recent commentators have pointed out some difficulties with the land ethic idea.[29] At the empirical level, it is not clear just how the manipulative effects of mankind are to be accommodated, since some of them may be stable and even beautiful but have unhappy social consequences.[30] At the philosophical level, professionals of that art have pointed out that the presence of a community fails to generate obligations *ipso facto*. There must be common interests among the members plus a recognition of their mutual obligations for them to be imposed. Further, it can be argued that it is not right to extend ecological concepts like stability, homeostasis and equilibrium to the realm of ethics without proper

analysis and qualification. It is certainly the case that these concepts are subject to continual refinement and sometimes radical change. Yet, it is counter-argued, such concepts might provide in some way as yet unspecified a set of objective and cross-cultural norms for the moral assessment of human impact on the environment;[31] further, the nature of the biosphere may be such that, for example, humans and bacteria do have a common interest although they may not be able to communicate this in writing.[32] Although ethical diversity and plurality in themselves may be a moral good,[33] it is difficult to avoid the problems of variability and language. As Aristotle first said, ethics and politics deal with continuous variables and so there could be no certainties in the field of normative decision; similarly we ought perhaps to acknowledge that ecology is not likely to provide the same kind of quantitative and predictive help as the laws of physics and chemistry. It is perhaps always going to be better as a component of attitude formation, but even here there may be the need to formulate different languages and terminologies for ecology as one of the instrumental sciences of human-directed environmental manipulation and as an agent and motivator of environmental protection and preservation.[34]

Beyond this relatively obvious outgrowth of ecological science, another ethic has been put forward, based this time on the convergence of the Gaia hypothesis and the ideas of self-realisation which the West discovered after about 1965. A labelling phrase might be something like 'secular transcendent holism', but plain 'Holism' is less of a mouthful. We recall that the Gaia hypothesis is based on the existence of a number of planetary feedback mechanisms which tend to optimise the conditions for life, though not necessarily for human life-styles, and that they appear to form a genuinely single system. Thus the single term 'Gaia' can be used and the pronoun 'she' is often a corollary, as is the postulate that she behaves in some ways like a single organism.[35] Philosophers have tried then to explain the peculiar features of the human presence within the Gaian system. On the one hand humans may possibly form the nervous system of this 'organism', able to communicate with all of the parts as well as with each other. The flow of information between some sectors and the humans may well be in the form of intuitive knowledge rather than scientific knowledge since we may not yet know explicitly all the ways in which Gaia communicates with her parts.[36] On the other hand, alas, humans might be more akin to cancer cells, proliferating exponentially and 'eating' everything in sight. In that case, modified behaviour propelled by a holistic ethic in which we are 'greened' by Gaian forces is the only route to human survival.

The core of the new environmental behaviour then becomes an awareness of self in which we no longer stop at the boundary of our skins nor indeed perhaps at the limit of our tentacular reach for resources. Instead we are to see ourselves as united with the rest of the universe in a ground of being. One analogy would be that of a drop of water from an ocean: each drop is individual and unique but all are of the same essence as the ocean. This type of thinking has been carried forward by the physicist D. Bohm who uses as analogy the laser hologram in which every portion of the image carries the information needed for the whole.[37] He talks of the material world as being the explicate manifestation of an implicate order in which everything (including human consciousness) is enfolded in everything else. The non-duality of humans

and environment thus suggested is reminiscent of many of the religious and philosophical systems of the East.[38] A time dimension may be important as well, for this seems in the western tradition to be unidirectional and thus makes possible the theory of evolution. Secular holists have taken over the concepts of Teilhard de Chardin (which are of course religious: he was a Jesuit[39]) in which there is a progressive infolding of all nature, transforming itself towards some final omega-point of convergence of the consciousnesses of everything. In secular versions, mankind becomes a director of the course of evolution (consider genetic manipulation for example) and thus has special responsibilities. For Henryk Skolimowsky, for instance,[40] we must become the equivalent of priests superintending the unfolding of a sacred drama.

To look for simple rules and cohesive patterns of discussion in the literature and events of ecology-based ethics is very difficult. Perhaps there is throughout an emphasis on process as distinct from objects, in the sense that what we call things are no more than isolated glimpses of something in the process of becoming, just as the bright star is dependent for its luminosity on the darkness of space or just as life holds within itself the promise of death.[41] The human role is seen by some to be determined by Gaian imperatives in which by some metanoic process we shall all change our behaviour; others prefer a continuation of our Promethean traditions, in which we must assume that we are the governors and the innovators but having like all rulers a special responsibility for those whom we rule. Harnessing biotechnology and all other forms of technology, the inheritors of the mantles of Chardin and Buckminster Fuller[42] are anthropocentric to the point of wanting humans consciously to manage the evolutionary processes of the planet: humans act as co-pilots of Spaceship Earth, making management decisions based on information technology. Although starting out from similar bases to the ecological ethics programmes described above, and responding to similar initial environmental pathologies,[43] the holists of this kind are a long way from ecocentric, as distinct from anthropocentric, behaviour.

Theology-based Ethical Systems

Common to all religions is the idea of a first and ultimate cause, usually expressed verbally as God (or Gods) or the One, or a variant of these words. In many societies, the gods have been identified as being present within all or some of the phenomena of nature and hence as much part of the environment as the air: **pantheism** of this kind, for example, was characteristic as much of ancient Greece as it is of some aboriginal North Americans today.[44] In the West, however, **monotheism** has become dominant[45] and this has been exported along with the other components of the western worldview; we shall here examine the western traditions first and then look at the contribution of other parts of the world.

In the West, early developments about which we know certainly included nature and her processes as part of the focus for worship and ritual and indeed the mystery of the life force was located within such an ecology. The eclipse of these religions by Judaism and then by Christianity, however, removed the mystery to the one God who was spatially much more remote than His many predecessors, though knowledge of

Him could now be passed down in written form. At any rate, it could be deduced that there was something of a gap between God and mankind and that the close identification of humans with the land was to some extent sundered: 'The land belongs to me, and you are strangers and guests' (Leviticus 25:53). Even the concept of time became different in post-Judaic western religion, for it could not be renewed annually but was linear and each instant was unique. Thus the past could be romanticised as it passed further away and the notion of a Golden Age was born.[46]

The burgeoning of interest in the environment from the 1960s provoked a surge of examination of the Christian position: was mankind indeed alienated from 'the land' for one reason or another, or were we all still part of a continuing Creation which was good, to put it in a highly simplistic form?[47] The first tradition is perhaps the easiest to identify and describe. It derives from the notion that mankind is made, uniquely in the omneity, in the image of God and therefore has the right to behave in a god-like manner towards the rest of the cosmos. This at first sight appears to be the message of the much quoted passages in Genesis I 26–29, where being fruitful, multiplying, having dominion and subduing the earth are the direct commands of God, though not, we must reluctantly presume, in English.[48] This passage was used by Lynn White, a North American historian,[49] as the basis for saying that the 'ecologic crisis' could be laid at the door of the Judaeo-Christian religious heritage of the West, since this passage clearly gave a licence to exploit plants, animals and even every creeping thing. A kind of confirmatory evidence of this view comes in Pope John Paul II's Third Encyclical *Laborem Exercens* in which the forcing of nature to productivity for human ends is seen as a kind of quantitative measure of human grandeur.[50]

A second long-standing tradition is that humans are part of God's Creation just like the rocks and the trees and that no one part of this is inherently superior to another: there is a basic spiritual equality. In this view, both man and nature become co-creators of the cosmos (*cosmos*, it will be remembered, is a world with order) and God is, has been, and will be present in all things. This doctrine of immanence is more sharply focused by the life of Christ, which confirmed that the universe is within God (i.e. pan-en-theism).[51] The rather less abstract symbol of this strand of belief is generally taken to be Francis of Assisi talking of Brother Sun and Sister Moon[52] and preaching to the birds (did he listen as well?); here in Northumbria we have our own ikon, that of the ascetic St Cuthbert being kept warm by Eider Ducks (still known regionally as Cuddy Ducks[53]) after one of his spells of fasting and immersion in the North Sea. Recent interest in this tradition has produced for us figures like Hildegard of Bingen (1098–1179) who celebrates the inherent divinity and beauty of all creation. This is coupled with warnings about the sins of indifference and injustice to nature, for creation demands justice.[54] She used the term *viriditas* ('green truth') and wrote some prescient poetry:

> Now in the people
> that were meant to be green …
> The winds are burdened
> by the utterly awful stink of evil, …
> Sometimes this layer of air
> is full,

full of a fog that is the source of many destructive and barren creatures
that destroy and damage the earth
rendering it incapable
of sustaining humanity.

Much Christian theology is, however, dominated by the concept of the Fall. Any human act is therefore imperfect (and at best provisional) and its redemption is by Grace and probably not in our time.[55] Since the Bible is the source of this world-view, it can also be seen as the only source of ideas about adapting to it. But faith in the literal truth of the Bible as a source-book for ethics as well as theology is variable.[56]

It seems as if there are two distinct ethical strands which can be woven out of history and dogma. They relate to the historical traditions discussed above, though with added elements in each. From the first strand comes the common-sense exhortation to recognise the superiority of mankind as being at the apex of creation (so far) but to use the power thus granted with an acute sense of responsibility. This is particularly a Benedictine trait and the example of reclamation of waste places by their medieval abbeys is often cited. So the notion of stewardship is paramount: we are in the position of temporary holders only of the office of steward or vice-regent or overseer and we are required by the Landlord to leave the estate in at least as good a condition as we found it.[57] One trouble here is that the instructions for doing so are nowhere near as explicit as those found say beside the bath in a cheap hotel: how do religious people decide whether it is right to drain swamps or to preserve them for their wildlife?

In some contrast, the Franciscan view has been much amplified by being caught up in the kind of evolutionary mysticism propounded by Teilhard de Chardin. He saw cosmic history as an evolution of consciousness which would end with a total enfolding of the Universe at an omega-point, a final unity with the glorified Christ as Pantocrator.[58] So today's Franciscanism has a much less practical outlook than the stewardship camp (though it is presumably not incompatible with it) in the sense that it is more contemplative and seeks to 'green' (to borrow a phrase) individuals rather than produce institutional change in an overt manner. Essentially, this strand of belief plays down the fallen side of humanity and prefers to be celebratory so as to revel in the diversity of all forms of life and the richness of human culture.[59]

The ethical implications of the kinds of beliefs outlined above are not easy to discover, for Christians seem to be able to discover a whole range of proper responses to them: some justify rapid use of resources to create wealth on the grounds that if the Samaritan had not been wealthy he would not have been able to help, whereas others argue for vegetarianism and an extra sweater. There seems to be some concentration, nevertheless, on the preservation of the wild and its non-human inhabitants, on our responsibility to future generations, on respecting the carrying capacity of our surroundings, on the satisfaction of genuine need rather than the inflated demands of consumerism,[60] on the use of appropriate technology rather than everything that the inventors can come up with and sell, and with the need to resacralise nature.[61] This last involves putting some of the reverence for life and its mysteries and connectivities back into nature herself rather than allowing it to reside in a remote judgemental sky-god. The poet Gary Snyder phrased it in a rather extreme but cogent way when he

said that our [ecological] troubles began with the invention of male deities located off the planet. No wonder, then, that a mystical version of Gaia is attractive to those on the fringes of western religions. Such developments have persuaded radical-thinking but tradition-rooted theologians like J. B. Cobb to develop postmodern religious views which combine the insights of the natural sciences with those of creation-based western theology.[62]

Non-western Religions

In the years of high public concern with environmental matters that ended with the UN Conference in Stockholm in 1972, there was much interest in eastern philosophies and religions, and in North America in the beliefs of the native peoples. A contrast can be drawn, for example, between the instrumental view of nature espoused by Anglo-Americans, in which the land and waters are simply resources, and that of the Indians.[63] For the latter, their traditional cultures held that they occupied a sacred space and that all their actions therefore needed sanction from a god or gods, often accompanied by the appropriate ritual. With renewed self-consciousness, however, these beliefs are undergoing a renaissance among the Indians themselves and they are being held up by some in the Euro-American community as examples for the nation to follow.

The religions of the North American aborigines (like those of Australia) have never shown much capacity for exportability, whereas those of south and east Asia have always had some fascination for westerners. Thus again in the 1960s and 1970s, Hinduism and Buddhism became much better known in the West and especially for the environmental attitudes which they potentially engendered. (Buddhism will be treated here as a religion since it seems to function as such, though *sensu stricto* it is atheistic.) In Hindu cultures, there is a long tradition of environmental protection, couched under the concept of non-injury or *ahimsa*.[64] In fact, the adoption of vegetarianism and a simple life-style as advocated by Mahatma Gandhi constitutes in itself a predisposition to a relatively low environmental impact.

For Buddhists, the environment is not different from most other phenomena: it can be an object of human attachment and therefore of suffering. Thus an attachment to worldly things that derive from it will end in unhappiness and the law or *Dharma* will ensure that the soul will not escape from the cycle of continual rebirth. There is then a *de facto* ethic of low impact which once again finds expression in an aversion to the taking of life and hence to vegetarian eating. At some stage in its eastward spread from India, Buddhism took aboard many of the essentials of the native Chinese Taoism and the result is known by its Japanese name, Zen.[65] The Tao stressed a quietistic attitude to life: harmony with the cosmos was to be sought by finding its ways and rhythms and adapting to them, rather than striving to alter things and other people. The contribution of Zen has been in stressing the unity of all things and in the primacy of experiential knowledge rather than objective rationality. Buddhism has combined with native Japanese animist religion (*shinto*) to produce one of the most nature-conscious and delicate aesthetics ever. This too is underlain by a non-dualist

philosophy in which the subject-object division of western positivism is absent. This is often summarised in the Japanese phrase '*mono no aware*' ('sensitivity to things'). Emotion is the basis for an awareness of other species, light, weather and eventually of the environment as a whole. There is no vestige of a hierarchy of existence.[66] Since the nineteenth century this has not prevented western values from predominating (indeed, it may have encouraged them since change is always to be expected) although there is now renewed interest in traditional Japanese values and ways.[67] In a broader sense, a progression of concentration upon visual images and their associated emotions can produce the metaphor of nature as a mandala. We might compare this with the well-known image of Earth from space. Such a view of interconnectedness is more explicitly delineated in a central image of Hua-yen Buddhism, the jewel net of Indra. A net is hung which stretches out infinitely in all directions. In each 'eye' of the net is hung a single jewel in whose polished surfaces is reflected all the other jewels, infinite in number. The relationship is one of simultaneous mutual identity and mutual inter-causality.[68]

Islam is monotheistic and based on a book like Judaism and Christianity, and the book (the Holy Qur'ān) is quite explicit in setting humans as stewards of the gifts of Allah.[69] All human activities must be based on the idea that the Earth is only a temporary home (even though man is a superior being) and that to find favour in the next world, our actions must be properly administered as a manifestation of faith. These include justice and piety plus the appropriate knowledge and understanding of environmental problems.

It has to be said that in both East and West many religious traditions have collaborated with human behaviour that is destructive of species and habitat, and with non-sustainable development. In the West, obviously, there has been little sieving of technology and much talk of the conquest of nature; in the East no guidelines have been elaborated for alternative forms of economic and social growth that are ecologically sustainable.[70] In all, some reconstruction of the historic faiths seems to be needed if they are to contribute to an evolutionary *modus vivendi*. It seems unlikely at the moment that, outside the areas of revolutionary Islam, religion as such will play a large part in directly developing normative behaviour, though it may well contribute to the formation of new public ethics of an environmentally related character.

Deep Ecology

It is obvious that both ecological ethics and spiritually inspired holism require a change of world-view. A harmony with nature, the avoidance of pollution, the discussion of the possibility of all life having its own intrinsic value, self-realisation rather than economic growth and consumerism, appropriate technology, recycling and thrift, and the organisation of human communities on a regional basis, with great attention paid to minorities, are all found at one point or another in the literature of advocacy. Some, however, have seen this as reformist rather than radical and hence an insufficient response to today's problems. A more radical position is called Deep Ecology and is largely associated with the Norwegian philosopher Arne Naess, who in the

1930s worked with the Vienna School of positivists but who has moved rather far from them.[71] Naess's concept of Deep Ecology collects together the findings of ecological science, the pantheism and process metaphysics of Baruch Spinoza (1632–77), and the historical linguistics of Heidegger.[72] Like some western and many eastern philosophies, Naess constructs a world-view with no ontological divide in the field of existence: there can be, for example, no dichotomy of reality (or value) between the human and the non-human. Similarly, people are knots in a total field and the realisation of Self must not lead to self-centredness but rather to a connectivity with all things which goes beyond mere altruism. This world-view translates into two fundamental norms. The first of these is shared with some of the New Age advocates in the primacy accorded to self-realisation. In this, we must achieve identification with the non-human world: we must learn to 'think like a mountain' and hence let all things be themselves. To harm nature is to harm ourselves. The second norm, also shared to some extent by the previous systems, is that of biocentric equality. The world is no longer our oyster, we share it with the oysters (Table 7.1).

In such a world all things are able to achieve their own self-realisations and thus the space occupied by any 'thing' (ourselves and our technology especially) must be limited to allow all the other things to flourish. One of the great differences between Deep Ecology and the other holisms, however, is its insistence on the value of the experiential as well as the rational, believing as it does that Cartesian dualism is at the heart of most unsustainable relationships within the biosphere. Naess finally collects all his ideas into what he calls *ecosophy*, 'eco-wisdom'. But as his book sets out, he can only talk of 'an ecosophy' because this is a personal system yet one which recognises that many different yet mutually acceptable interpretations of nature are both possible and acceptable. Criticism has been quite strong.[73] There are the obvious questions of the 'how do we get there from here' type, but also a fear that any challenge to the absolute reality of the discrete human individual will lead to some form of totalitarian nightmare: ecological fascism is the label sometimes applied. The counter-argument centres round the opposite view that the glorification of the rights of the individual has in practice led as much to totalitarian societies as those based on notional equality.

The scope for developing Deep Ecology seems quite wide. Recently, other currents seem to have got merged with it: examples are systems thinking, bioregionalism, holistic medicine and healing, feminism and the nuclear disarmament movement. Green politics in its more radical forms is also a likely component.

TABLE 7.1
A Platform for Deep Ecology

1	The value of non-human life is independent of the usefulness of the non-human world as resources.
2	The diversity of life forms has a value in itself and humans may reduce this variety only to satisfy vital needs.
3	The flourishing of non-human life requires a diminution of the size of the human population.
4	The increasing manipulation of the non-human world must be reversed by the adoption of different economic, technological and ideological structures.
5	The aim of such changes would be a greater experience of the connectedness of all things and an enhancement of the quality of life rather than an attachment to material standards of living.
6	Those who agree with this have an obligation to join in the attempt to bring about the necessary changes.

SOURCE: Adapted from A. Naess, 'Deep ecology and ultimate premises', *The Ecologist* **18** (4/5) 1988, 128–31.

Towards a Radical Reconstruction

Many of the commentators on philosophy and ethics remark on the problems of all kinds caused by the almost overwhelming representation of anthropocentrism in western thought and world-view. Since these features of western lifestyle dominate the world in practice, they must be addressed if they are in fact the source of environmental problems. As we have seen, some thinkers try to increase our sense of responsibility, others would go in for mutual coercion, yet others would extend equal moral and legal standing to non-human objects which is in itself logically an anthropocentric act. So there is room for an altogether different way of looking at the difficulties, always bearing in mind that there will be problems of language if we wish to formulate radically novel concepts.

The philosopher most often cited as providing the beginning of such a construction is Martin Heidegger (1889–1976). He attempted to provide a new understanding of what things are and how humans should behave in the knowledge of that understanding.[74] He did not, however, try to formulate a developed ethic, but set an agenda for an all-encompassing *ethos*. For Heidegger, a central concept was that of Being: an event in which an entity could reveal or manifest itself as it really is. All things manifest themselves to each other (as the sun shines on flowers, for instance) but humans have the special capability of noticing that such presences occur. We are actually aware (in a way we suppose beetles and rocks are not) that these entities have a being and also that they might not have one. What then is the authentically human way to live in the presence of all these other beings? For Heidegger, human history and existence constitute a spatial and temporal clearing in which Beings can manifest themselves and be what they truly are, irrespective of their usefulness to us. But being ourselves Beings, we have an essential relatedness to all other beings and therefore to diminish their being is always to diminish ourselves. So here we are beyond the idea of the extension of rights to other components of the biosphere: Heidegger put forward the idea that the core of the relationship was care (*Sorge*) with humans as shepherds of Being, where that Being was a totality of earth and sky, gods and mortals assembled together. All these ways of being are significant and no one determines the nature of the others.[75] In other words, we allow ourselves freedom to Be what we truly are when we understand rightly what our place is in the universe, and that is certainly not a position which regards all other beings as a 'standing reserve' of materials.

> Mortals dwell in that they save the earth. … Saving does not only snatch something from a danger. To save really means to set something *free* into its own essence. To save the earth is more than to exploit it or even wear it out.[76]

In the end, the message seems to be that in the West especially we must be more open to the possible and that may well mean accepting that there are limits to the sort of rationality to which Aristotle and Descartes have accustomed us.

The End of Ethics

The study of normative behaviour looks inwards and outwards at the same time. In the case of the former, there are two especially popular windows. There are those who say that basically the human concepts of utility and justice as elaborated in the West are all that is needed for a viable and valid environmental ethic. But a problem here is the fragmentation of advanced societies into systems such as law, education, economy and religion. The need for an ethic produces a level of debate in each. But since no one function system equals the whole of society, the level of resonance in any one function system does not necessarily produce a valid ethic for all. Thus others argue that some new metaphysical insights (in particular going beyond the present range afforded by the various brands of humanism) are needed.[77] In the latter field, the non-separation of everything which is one of the more startling results of modern quantum theory at the particulate scale is a possible starting point for the discovery of intrinsic value in non-human entities. Here, if the self is valuable, then all else is equally valuable.[78] This argument can be extended to suggest that the universe in its entirety possesses a measure of self-hood in being a self-realising system. It does not have a purpose or *telos*, but it is dynamic and unfolding just like smaller scale manifestations such as an organism. This idea of self-realisation can be extended to inorganic things if we include the system in which they are embedded. Humans can add an extra dimension since we alone can understand our relationship with greater wholes as well as smaller parts.[79]

It is difficult to see a discussion of the Copenhagen Interpretation of quantum theory being the basis for a Greenpeace call for funds.[80] But the movement towards the development of a better public ethic brings in various of the ideas discussed in the last few pages. They are neatly put together by Charlene Spretnak at the end of her book on spirituality in Green politics[81] and they act as a good overall focus precisely because they bear no very clear relationship to what she says earlier in the book, i.e. they are as valid in a secular context as in a transcendental one. She calls for ecological wisdom, grassroots democracy, personal responsibility over lifestyle, non-violence, community-based economies, post-patriarchal values, respect for diversity, a global responsibility and a vision for the future which focuses on the quality of life. Although there is a humanistic bias in these recommendations, they might well be a good start along even the most radical of non-anthropocentric roads towards an altogether different basis for ethics.

NOTES

1. It was clearly necessary at one stage to establish that environment was a fit topic for ethical inquiry and to try to define the outer boundaries of that inquiry. See H. Rolston, 'Is there an ecological ethic?', *Ethics* **85**, 1975, 93–109, reprinted in D. Scherer and T. Attig (eds) *Ethics and the Environment*, Englewood Cliffs, NJ: Prentice-Hall, 1983, pp. 41–53; T. Regan, 'The nature and possibility of an environmental ethic', *Environmental Ethics* **3**, 1981, 19–34; C. A. M. Duncan, 'On identifying a sound environmental ethic in history: prolegomena to any future environmental

history', *Environmental History Review* **15**, 1991, 5–30. As an overview introduction to the field, I found K. S. Shrader-Frechette (ed.), *Environmental Ethics*, Pacific Grove, CA: The Boxwood Press, 1981, especially helpful.

2. Ontology deals with what can, or cannot, exist, although in the case of nature this can be taken as given. The ontology then focuses on this and the foundations of our behaviour in it.

3. E. C. Hargrove, *Foundations of Environmental Ethics*, Englewood Cliffs, NJ: Prentice Hall, 1989, esp pp. 191–205. The recent history of the philosophy-ethics continuum in this field (very largely in North America, it seems) is described by R. F. Nash in chapter 5 ('The greening of philosophy') of his book *The Rights of Nature*, Madison, WI and London: University of Wisconsin Press, 1989.

4. The context is given for the use of both the natural and social sciences by J. Petulla, 'Toward an environmental philosophy: in search of a methodology', *Environmental Review* **2**, 1977, 14–43. See also the essays in J. R. Engel and J. G. Engel (eds), *Ethics of Environment and Development*, London: Belhaven Press, 1990, especially R. Kothari, 'Environment, technology, and ethics', pp. 27–35, and H. Rolston, 'Science-based versus traditional ethics', pp. 63–72.

5. B. S. Gower, 'What do we owe future generations?', in D. E. Cooper and J. Palmer (eds) *The Environment in Question: Ethics and Global Issues*, London: Routledge, 1992, pp. 1–12.

6. T. Regan, *op. cit.*, 1981.

7. J. Baird Callicott, 'Intrinsic value, quantum theory, and environmental ethics', *Environmental Ethics* **7**, 1985, 257–75. Not for the faint-hearted reader.

8. See F. Mathews, *The Ecological Self*, London: Routledge, 1991.

9. See the examples of P. R. Hay, 'The contemporary environment movement as Neo-Romanticism: a re-appraisal from Tasmania', *Environmental Review* **12**, 1988, 39–59. Also the extended treatment in A. Bramwell, *Ecology in the 20th Century: A History*, New Haven and London: Yale University Press, 1989.

10. M. Zimmerman, 'The critique of natural rights and the search for a non-anthropocentric basis for moral behaviour', *J. Value Enquiry* **19**, 1985, 43–53.

11. G. Hardin, *The Voyage of the Spaceship Beagle: Exploring New Ethics for Survival*, New York: Viking Books, 1972/Harmondsworth: Pelican Books, 1973; *idem*, 'Living on a lifeboat', *BioScience* **24**, 1974, 561–68.

12. P. Ehrlich, *The Population Bomb*, New York: Ballantine, 1968.

13. For a summary of this material see K. S. Shrader-Frechette, 'Alternative ethics regarding the environment', in idem, *Environmental Ethics*, Pacific Grove, CA: The Boxwood Press, 1981, pp. 28–44.

14. Most of this part of the discussion derives from R. Goodin, 'Ethical principles for environmental protection', in R. Elliot and A. Gare (eds) *Environmental Philosophy*, University Park and London: Pennsylvania State University Press, 1983, pp. 3–20.

15. These two paragraphs take their material from chapters 6–9 of R. Attfield, *The Ethics of Environmental Concern*, Oxford: Blackwell, 1983.

16. M. Midgley, *Beast and Man: The Roots of Human Nature*, Hassocks, Sussex: Harvester Press, 1979. See also R. Attfield, 'Attitudes to wildlife in the history of ideas', *Environmental History Review* **15**, 1991, 71–78.

17. See the historical discussion in chapter 5 of J. Passmore, *Man's Responsibility for Nature*, London: Duckworth, 1980, 2nd edn. Changes in sensibilities for one country for one 300-year period are illuminatingly discussed in K. Thomas, *Man and the Natural World: Changing Attitudes in England 1500–1800*, London: Allen Lane, 1983.

18. M. Midgley, *Animals and Why They Matter: A Journey Around the Species Barrier*, Harmondsworth: Penguin Books, 1983.

19. In May 1988 I saw the movie *The Unbearable Lightness of Being* which is filled with tragedy of various kinds. But it was the death of the dog that caused most tears in the audience.

20. See chapters 8 and 9 of R. Attfield, *op. cit.*

21. That is the idea that ideas can influence the practical world and that they should be graded in value by their success at the pragmatic level.

22. See T. Regan and P. Singer (eds), *Animal Rights and Human Obligations*, Englewood Cliffs, NJ: Prentice-Hall, 1976; P. Singer, *Animal Liberation: A New Ethic for Our Treatment of Animals*, London: Cape, 1976; idem, *In Defense of Animals*, Oxford: Blackwell, 1985; S. R. L. Clark, *The Moral Status of Animals*, Oxford: Clarendon Press, 1977.

23. A defence of commensense attitudes towards animals is given by M. P. T. Leahy, *Against Liberation: Putting Animals into Perspective*, London and New York: Routledge, 1991.

24. C. Stone, *Should Trees Have Standing? Towards Legal Rights for Natural Objects*, Portola Valley, CA: Tioga Publishing Co, 1988, 2nd edn.

25. M. A. Warren, 'The rights of the nonhuman world', in Elliot and Gare, *op. cit.*, pp. 109–34. See also, B. G. Norton, *Why Preserve Natural Variety?*, Princeton, NJ: Princeton University Press, 1987.

26. cf. Alan Watts, 'The world is your body', in R. Disch (ed.) *The Ecological Conscience: Values for Survival*, Englewood Cliffs, NJ: Prentice-Hall, 1970, pp. 181–93.

27. The main source is A. Leopold, *A Sand County Almanac*, New York: Oxford University Press, 1949. Be prepared for surprises like the delight in hunting and shooting. The earlier formulation can be seen in e.g. 'The conservation ethic', in the *Journal of Forestry* for October 1933, reprinted in R. Disch, *The Ecological Conscience: Values for Survival*, Englewood Cliffs, NJ: Prentice-Hall, 1970, pp. 44–55.

28. Leopold starts his 1933 paper by remarking on the fact that there was no ethical barrier to Odysseus hanging a dozen slave-girls when he got home on suspicion of their misbehaviour.

29. Especially J. Passmore, *op. cit.*, 1980.

30. In several of his works, the distinguished humanist René Dubos was fond of using the eighteenth-century landscape gardens of England as an example of the beneficent effects of the human hand. I tried, by correspondence, to convince him that there was another side to this in the shape of the dispossession suffered by many smaller landholders but I don't think I was ever persuasive.

31. W. T. Blackstone, 'Ethics and ecology', in W. T. Blackstone (ed.) *Philosophy and Environmental Crisis*, Athens, GA: University of Georgia Press, 1974, pp. 16–42.

32. R. Attfield, *op. cit.*, 1983, ch. 8.

33. J. R. Engel, 'Ethics', in D. C. Pitt (ed.), *The Future of the Environment: The Social Dimensions of Conservation and Ecological Alternatives*, London and New York: Routledge, 1988, pp. 46–59.

34. See the wide-ranging discussions in A. McLaughlin, 'Images and ethics of nature', *Environmental Ethics* **7**, 1985, 239–319; and M. Sagoff, 'Fact and value in ecological science', *ibid.*, 99–118.

35. For the Gaia-human mind linkage see P. Russel, *The Awakening Earth: Our Next Evolutionary Leap*, London: RKP, 1982.

36. T. Roszak, *Person/Planet: The Creative Disintegration of Industrial Society*, New York: Doubleday/Anchor, 1978; London: Gollancz, 1979.

37. D. Bohm, *Wholeness and the Implicate Order*, London: RKP, 1982.

38. Although pointed out in Aldous Huxley's *The Perennial Philosophy* (London: Fontana, 1958), the most famous statement of it in the present context is F. Capra, *The Tao of Physics*, Berkeley, CA: Shambhala Press/London: Wildwood House, 1975.

39. Pierre Teilhard de Chardin, *The Phenomenon of Man*, London: Collins, 1965. For a primer and guide to Chardin, try J.-P. Demoulin (ed.), *Let Me Explain*, London: Collins, 1970. When typing this chapter into the word-processor I used 'de' as an abbreviation for Deep Ecology, then replacing it globally with the full spelling. The result in two or three places was Pierre Teilhard Deep Ecology Chardin, which might delight some people.

40. H. Skolimowsky, *Ecophilosophy: Designing New Tactics for Living*, London: Marion Boyars, 1979.

41. F. Capra, *The Turning Point: Science, Society and the Rising Culture*, New York: Simon and Schuster/London: Wildwood House, 1982.

42. R. Buckminster Fuller, *An Operating Manual for Spaceship Earth*, Carbondale, IL: Southern Illinois University Press, 1969.

43. It is customary to point out that the Chinese ideograph for 'crisis' contains two elements: *wei* for 'danger' and *chi* for 'opportunity'.

44. M. Eliade, *A History of Religious Ideas*, vol. 1. *From the Stone Age to the Eleusinian Mysteries*, Chicago and London: University of Chicago Press, 1982, trans. W. R. Trask. First published in French in 1978.

45. Eliade, *op. cit.*, vol. 2. *From Gautama Buddha to the Triumph of Christianity*.

46. M. Eliade, *The Myth of the Eternal Return or, Cosmos and History*, Princeton University Press, 1971 (original edition 1954), Bollingen Foundation Series XLVI.

47. A chronology of changes in religious (mostly Christian) thought in North America is given by R. F. Nash in chapter 4 ('The greening of religion') of his *The Rights of Nature: A History of Environmental Ethics*, Madison, WI and London: University of Wisconsin Press, 1989.

48. J. Kay, 'Human domination of nature in the Hebrew Bible', *Ann. Assoc. Amer. Geogr.* **79**, 1989, 214–32.

49. L. White, 'The historical roots of our ecologic crisis', *Science* **155**, 1967, 1203–7, and much anthologised since as well as heavily criticised by both Christians and those of secular views. A fine example of a really seminal paper, right or not.

50. Quoted by J. Cobb, *Ecology and Religion: Toward a New Christian Theology of Nature*, Ramsey, NJ: Paulist Press, 1983. This whole book is probably one of the most concise and coherent statements of both history and dogmatics available.

51. A. R. Peacocke, *Creation and the World of Science*, Oxford: Clarendon Press, 1979, The Bampton Lectures, 1978. A difficult book but remarkable in its comprehensiveness.

52. Lynn White (see n 49) proposed St Francis as the patron saint of ecologists. However, Francis is quoted as saying 'every creature proclaims "God made me for your sake, O man!"' (P. Singer, 'Not for humans only: the place of nonhumans in environmental issues', in K. E. Goodpaster and K. M. Sayre (eds) *Ethics and Problems of the 21st Century*, Notre Dame, IN and London: University of Notre Dame Press, 1979, pp. 191–206).

53. Inexplicably, this legend is omitted from the anthology edited by C. Bamford and W. Parker Marsh, *Celtic Christianity: Ecology and Holiness*, Edinburgh: Floris Books, 1982. In fact there is some nature in this book but not much ecology.

54. See, for example, M. Fox, *Illuminations of Hildegard of Bingen*, Santa Fe, NM: Bear and Co, 1985; G. Uhlein, *Meditations with Hildegard of Bingen*, Santa Fe, NM: Bear and Co, 1983. She was no mean musician, either: listen to the *Symphoniae* on CD Editio Classica GD 77020.

55. H. Schwarz, 'The eschatological dimension of ecology', *Zygon* **9**, 1974, 323–38.

56. R. H. Hiers, 'Ecology, biblical theology, and methodology: biblical perspectives on the environment', *Zygon* **19**, 1984, 43–59.

57. At its fullest expression in J. Black, *The Dominion of Man: The Search for Ecological Responsibility*, Edinburgh University Press, 1970. Subsequently subjected to strong criticism by

J. Passmore, *Man's Responsibility for Nature*, London: Duckworth, 1980, 2nd edn, who argues that stewardship can only apply to the control of men by men. It is interesting to note that the Papal Encyclical of 1981 constantly refers to the subduing aspect of Genesis but not at all to the stewardship or responsibility aspects (*Laborem exercens*, Encyclical Letter of the Supreme Pontiff John Paul II on Human Work, London: Catholic Truth Society, 1981).

58. P. Teilhard de Chardin, *op. cit.*

59. See S. McDonagh, *To Care for the Earth: A Call to a New Theology*, London: Chapman 1986; M. Fox, *Original Blessing*, Santa Fe, NM: Bear and Co, 1983; idem, *Creation Sprituality*, London: Harper Collins, 1991. Matthew Fox was silenced by the Vatican in the late 1980s. The fusing of environmentalism, feminism and religion can be seen in A. Primavesi, *From Apocalypse to Genesis*, London: Burns and Oates, 1991. Primavesi sees the fall not as a cosmic tragedy but as a coming to maturity.

60. See, for instance, J. V. Taylor, *Enough Is Enough*, London: SCM Press, 1975, and the account of the low-impact lifestyle movement in H. Dammers, *Life Style: A Parable of Sharing*, Wellingborough, England: Turnstone Press, 1982.

61. A. R. Drengson, 'The sacred and the limits of the technological fix', *Zygon* **19**, 1984, 259–75. See also L. Gilkey, 'Nature, reality and the sacred: a meditation in science and religion', *Zygon* **24**, 1989, 283–98, and the extended discussion of 'sanctity' in H. Skolimowski, *Living Philosophy: Eco-philosophy as a Tree of Life*, London: Arkana Books, 1992.

62. J. B. Cobb, 'Ecology, science and religion: toward a postmodern worldview', in D. R. Griffin (ed.) *The Reenchantment of Science: Postmodern Proposals*, Albany, NY: SUNY Press, 1988, pp. 99–113.

63. J. Donald Hughes, *American Indian Ecology*, El Paso, TX: Texas Western Press, 1983; J. D. Hughes and J. Swan, 'How much of the earth is sacred space?', *Environmental Review* **10**, 1986, 247–59.

64. O. P. Dwivedi, B. N. Tiwari and R. N. Tripathi, 'The Hindu concept of ecology and the environmental crisis', *Indian J. of Public Administration* **30**, 1984, 33–67.

65. A well-known and somewhat flamboyant interpreter of the Tao and of Zen for westerners was Alan Watts. See his *Nature, Man and Woman*, New York: Vintage Books, 1970; first published New York: Pantheon Books, 1958.

66. D. E. Shaner, 'The Japanese experience of nature', in J. B. Callicott and R. T. Ames (eds) *Nature in Asian Traditions of Thought*, Albany, NY: SUNY Press, 1989, pp. 163–82. Another 'cross-cultural' comparison is made in D. E. Shaner and R. S. Duval, 'Conservation ethics and the Japanese intellectual tradition', *Environmental Ethics* **11**, 1989, 197–214.

67. F. Katayama and M. Kurosaka (eds), *Resonance Between the Essence of Nature and the Human Mind*, Tokyo: Shisakusa Publishing Co., 1988, 3 vols (in Japanese).

68. F. H. Cook, 'The jewel net of Indra', in Callicott and Ames, *op. cit.*, pp. 213–29; idem, *Hua-yen Buddhism*, University Park, PA: Penn State Press, 1977.

69. I. H. Zaidi, 'On the ethics of man's interaction with the environment: an Islamic approach', *Environmental Ethics* **3**, 1981, 35–47; IUCN, *Islamic Principles for the Conservation of the Environment*, Gland, Switzerland: IUCN, 1983.

70. R. Engel, 'Ethics', in D. C. Pitt (ed.) *The Future of the Environment: The Social Dimensions of Conservation and Ecological Alternatives*, London and New York: Routledge, 1988, pp. 23–45. In 1992, Cassel in London published five edited books constituting a set called *World Religions and Ecology*, with volumes on Buddhism, Hinduism, Christianity, Islam and Judaism.

71. The master statement is the book by A. Naess, *Ecology, Community and Lifestyle: Outline of an Ecosophy*, Cambridge: Cambridge University Press, 1989. Elsewhere, there appears to be a large and scattered literature. I have found the most accessible sources to be: R. C. Schultz and

J. D. Hughes (eds), *Ecological Consciousness*, Washington, DC: University Press of America, 1981, especially the contributions by Dolores LaChapelle, pp. 295–324, and G. Sessions, pp. 391–463, which has a very large bibliography; B. Devall and G. Sessions (eds), *Deep Ecology: Living as if Nature Mattered*, Salt Lake City, UT: Peregrine Smith Books, 1985; G. Sessions, 'The Deep Ecology movement: a review', *Environmental Review* **11**, 1987, 105–25; F. Matthews, 'Conservation and self-realization: a deep ecology perspective', *Environmental Ethics* **10**, 1988, 347–55. Earlier work by Naess includes 'The deep ecology movement: some philosophical aspects', *Philosophical Inquiry* **8**, 1986, 10–31, and 'The shallow and the deep, long-range ecology movements: a summary', *Inquiry* **16**, 1973, 95–100.

72. See in particular N. Evernden, *The Natural Alien*, Toronto and Buffalo: University of Toronto Press, 1985. Also, E. M. Curley, 'Man and nature in Spinoza', in J. Wetlesen (ed.) *Spinoza's Philosophy of Man*, Proceedings of the Scandinavian Spinoza Symposium 1977, Oslo: Universiktsforlaget, 1978, pp. 19–26.

73. In e.g. A. Brennan, *Thinking about Nature*, Athens, GA: University of Georgia Press, 1988, especially the chapter on 'Theory, fact and value'. Deep Ecology does not go far enough for G. Foley, 'Deep ecology and subjectivity', *The Ecologist* **18** (4/5), 1988, 119–22.

74. The chief exegete in the environmental field is M. E. Zimmerman. See e.g. 'Towards a Heideggerian *ethos* for radical environmentalism', *Environmental Ethics* **5**, 1983, 99–131; 'The critique of natural rights and the search for a non-anthropocentric basis for moral behaviour', *J. Value Inquiry* **19**, 1985, 19–43.

75. There are echoes here of the Gaia hypothesis. I sometimes feel that Heidegger was putting poetically what science has subsequently revealed but I expect to be told that I have an imperfect understanding of the depth of Heidegger's thought.

76. Quoted by L. Westra, 'Let it be: Heidegger and future generations', *Environmental Ethics* **7**, 1985, 341–50, from Heidegger's *Basic Writings*, New York: Harper and Row, 1977, ed. D. F. Krell.

77. The staunchest protagonist of the continued primacy of western rationalism is generally held to be John Passmore, aided by the clarity of his expression. However, in the second edition of *Man's Responsibility for Nature* (London: Duckworth, 1980) he says in an Appendix that the working out of a new metaphysics for nature is 'the most important task that lies ahead of philosophy' (p. 215).

78. J. B. Callicott, 'Intrinsic value, quantum theory, and environmental ethics', *Environmental Ethics* **7**, 1985, 257–75. This identification presumably goes beyond the dualities derived by some authors from the 'humans live in two worlds' (ecological and psychological) stance where it is argued that 'nature' cannot be an ethical realm in the way 'human society' can: there are more differences than similarities between the two realms in this view. See for example R. W. Gardiner, 'Between two worlds: humans in nature and culture', *Environmental Ethics* **12**, 1990, 339–52.

79. The notion of self-realisation extending beyond the human is fundamental to F. Matthews, *The Ecological Self*, London: Routledge, 1991. She develops in particular the version of it called the **conatus** by Baruch Spinoza (1632–77).

80. Though we should not forget that F. Capra's *The Tao of Physics*, Berkeley, CA: Shambhala Press/London: Wildwood House, 1975, was a best-seller and there have been several imitators, such as G. Zukav, *The Dancing Wu Li Masters*, London: Fontana, 1979; R. Jones, *Physics as Metaphor*, London: Abacus Books, 1983.

81. C. Spretnak, *The Spiritual Dimension of Green Politics*, Santa Fe, NM: Bear and Co, 1986.

Population

In the late 1700s, Thomas Malthus predicted a grim future in which human population growth would outstrip the environment's capacity to produce food. The resulting social strains and environmental deterioration would generate chaos and social disintegration. Since then, researchers have continued to ponder the link between population and environmental processes. Malthus's ideas retain their allure. (He appears here in the contributions by Caroline Bledsoe, Fattoumatta Banja, and Allan G. Hill; Simon Dalby; and Lester Brown, Gary Gardner, and Brian Halweil.) Demography, however, includes interests in mortality, migration, health care, and life cycle processes, as well as fertility. As Fricke notes, anthropology's contribution to demographic studies is to show how culture and daily life experiences provide the context in which people make the decisions and choices which shape broader population changes (Fricke 1997).

The basis for a broader demographic approach in anthropology can be found in Ester Boserup's renowned theory of agricultural intensification and is illustrated by Sally Ethelston's report on connections between environment and health in urban Cairo. Boserup has been influential in the work of agricultural ecological anthropologists, such as Netting. Her thesis, that population density results in agricultural intensification, has implications for the large-scale migrations out of rural areas witnessed during the 19th and 20th centuries. Boserup's work furthermore speaks to questions of economic development raised in Section 3. In contrast, Ethelston's work in an urban setting makes for more pessimistic reading. She brings population issues into the policy realm by discussing the collective action she believes necessary to combat the combined problems of deteriorating environments, health standards, and population growth. Given that most population-environment research focuses on population growth, Ethelston raises the important question of whether measures to curb high birth rates work to liberate or further oppress women.

Students may detect some real differences between reporting styles and data collection techniques in this section. Brown et al.'s summary figures stand in contrast to Bledsoe's nuanced and intimate local knowledge of fertility practices. The numerical snapshots stand in contrast to complex ideas about what children mean to the families and communities who raise them. These reporting styles appeal to divergent audiences and themselves have an impact, separately from the information they convey. This section offers a sense of how information becomes transformed as authors promote their particular position to different audiences.

The global nature of population debates means that this section begins to open the question of global environmental issues. Simon Dalby takes on the global implications

of Malthusian thinking in his article, which serves both as this section's ethical and polemical reading.

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Some Perspectives and Implications

Ester Boserup

Agriculture in Europe and the United States has undergone a radical transformation in the last century. Scientific methods of cultivation have been introduced and mechanized equipment and other industrial products have become widely used.

On the background of this technical revolution of agricultural procedures in the already developed world, agrarian change in underdeveloped countries may seem trivial, and it is understandable that many economists should presume that in countries where agriculture has not yet reached the stage of scientific and industrial methods it is stagnant and traditional, almost by definition.

The preceding chapters should have shown that this view is unwarranted, and that in the supposedly immutable communities of primitive agriculture profound changes are in fact occurring.

Students of economic history have not failed to describe the successive changes within primitive agricultural systems, but this has largely passed unnoticed by economists. They tended to regard the existing methods of cultivation and systems of land use as permanent features of a given locality, reflecting its particular natural conditions, rather than as phases in a process of economic development. In accordance with this view, the causal explanation of differences in cultivation systems was supposed to be a matter for geographers to consider; and these would naturally be inclined to explain differences in agricultural methods in terms of climatic conditions, type of soil and other natural factors which were believed to remain uninfluenced by changes in the size of population. It is in the logic of this approach to expect that major increases of agricultural population within a given area must result in the emergence of a labour surplus on the land and a consequent pressure for migration to other regions or to urban areas.

Our investigation lends no support to this conception of an agrarian surplus population emerging as the result of population growth. We have found that it is unrealistic to regard agricultural cultivation systems as adaptations to different natural conditions, and that cultivation systems can be more plausibly explained as the result of differences in population density: As long as the population of a given area is very sparse, food can be produced with little input of labour per unit of output and with

virtually no capital investment, since a very long fallow period helps to preserve soil fertility. As the density of population in the area increases, the fertility of the soil can no longer be preserved by means of long fallow and it becomes necessary to introduce other systems which require a much larger agricultural labour force. By the gradual change from systems where each cultivated plot is matched by twenty similar plots under fallow to systems where no fallow is necessary, the population within a given area can double several times without having to face either starvation or lack of employment opportunities in agriculture.

Some economic historians, noting the process of gradual shortening of fallow with accompanying changes in methods in many rural communities, made the observation that these changes occurred in periods of increasing population. The mere observation of this relationship leaves us with the further question of whether the increase in population is the effect or the cause of the agrarian changes.

The empirical study of the historical sequence is not very helpful in answering this question. Changes in patterns of land utilization and in agricultural methods usually occur gradually over long periods, and the same is most often true of demographic changes. Therefore, it is often difficult or impossible to determine through historical research whether the demographic change was the cause or the effect of the changes in agricultural methods. In the absence of a clear answer from historical sources, many historians have been inclined to presume a line of causation conforming to Malthusian theory, with the agrarian change as the cause and the long-term demographic trend as the effect.

The present study attempts to approach from another angle this important question of what is cause and what is effect. The method is the indirect one of comparing labour costs per unit of output in the main systems of primitive agriculture. The conclusion drawn from this comparison was that the complex changes which are taking place when primitive communities change over to a system of shorter fallow are more likely to raise labour costs per unit of output than to reduce them. Therefore, it seems implausible to explain upwards changes in rates of population growth as a result of this type of agrarian change. It is more sensible to regard the process of agricultural change in primitive communities as an adaptation to gradually increasing population densities, brought about by changes in the rates of natural population growth or by immigration.

According to the explanation offered here, population increase leads to the adoption of more intensive systems of agriculture in primitive communities and an increase of total agricultural output. This process, however, can hardly be described as economic growth in the generally accepted sense of this term, since the proximate effect upon output per man-hour is to lower it. But sustained growth of total population and of total output in a given territory has secondary effects which—at least in some cases—can set off a genuine process of economic growth, with rising output per man-hour, first in non-agricultural activities and later in agriculture. Such secondary effects come about through two different mechanisms. On the one hand, the intensification of agriculture may compel cultivators and agricultural labourers to work harder and more regularly. This can produce changes in work habits which help to raise overall productivity. On the other hand, the increasing population density facilitates

the division of labour and the spread of communications and education. The important corollary of this is that primitive communities with sustained population growth have a better chance to get into a process of genuine economic development than primitive communities with stagnant or declining population, provided of course, that the necessary agricultural investments are undertaken. This condition may not be fulfilled in densely peopled communities if rates of population growth are high.

According to the theory propounded above, a period of sustained population growth would first have the effect of lowering output per man-hour in agriculture, but in the long run the effect might be to raise labour productivity in other activities and eventually to raise output per man-hour also in agriculture. In a development pattern of this kind, there is likely to be an intermediary stage where labour productivity in agriculture is declining while that of other activities is increasing. This period is likely to be one of considerable political and social tension, because people in rural areas, instead of voluntarily accepting the harder toil of a more intensive agriculture, will seek to obtain more remunerative and less arduous work in non-agricultural occupations. In such periods, large-scale migrations to urban areas are likely to take place and to result in hardening competition in urban labour markets. The flight from the land may reach such proportions that it precludes the necessary expansion of food production in the villages, with the result that the town population must carry the double burden of lacking employment opportunities and high food prices. Difficulties of this type have occurred in most developing countries in the past, and they have been dealt with in very different ways: some European countries went as far as to reintroduce rural serfdom in order to curb the drift of rural youth to the towns; others tried to counteract internal migration by legal restrictions, or to introduce agrarian reform as an incentive for people to remain in the rural areas.

In cases where the migrations from village to town at this stage of development are allowed to continue without restraint, the ensuing relative rise of food prices may provide the needed incentive for an intensification of agriculture and be followed by a rise of rural money wages which helps to keep migration within bounds.

An alternative to the acceptance of rising food prices is to allow the importation of food. Increased food imports at this stage of development is a means to avoid the political and social trouble in the urban areas which would be likely to follow rising prices of food in terms of urban wages. However, if the import of food contributes to prevent or retard the intensification of domestic agriculture, the inflow of rural labour to the towns may continue. The result may be a slack labour market in urban and rural areas, particularly in cases where the need to finance the food imports leads to measures which reduce employment opportunities in the urban areas.

In the past century, the pressure of population growth was mitigated in many underdeveloped countries by the possibility of sustained expansion of the production of tropical crops for exports. The rapid growth of both population and *per capita* incomes in many countries in the temperate zones created expanding markets for such crops at prices which were so high that cultivators, by changing over from food production for domestic consumption to production of export crops, could earn a subsistence wage or income with a smaller input of labour than would be required to obtain the same income by the production of food crops in intensive systems of agriculture.

Therefore, increasing numbers of the rising populations in many underdeveloped countries took to the cultivation of export crops.

The type of development just described is characterized by a sharp contrast between the sector producing for exports and the sector which continues to produce food for subsistence. The rising numbers in the export sector are consuming mainly food and non-agricultural goods imported from other areas. The stagnant or gradually declining numbers in the subsistence sector continue to produce their own food by long-fallow systems, have little division of labour and contribute little to the growth of urbanization, which is limited to one or a few centres of foreign trade.

World markets for tropical export crops are no longer expanding so quickly that they can provide sufficient outlet for the more and more rapidly growing rural populations in the tropical countries. These are faced with the choice between harder work in more intensive food production, or migration to urban areas. They seem in most cases to choose the latter solution in so great numbers that urban labour markets become oversupplied with unskilled labour, while the labour supply in rural areas is insufficient to allow the needed shift from long fallow to more intensive agriculture. It thus seems that now, as in the past, there is a choice between increasing food prices, food imports or direct government intervention, in one form or the other, against migrations from the countryside.

It might be objected that the recent revolution of agricultural techniques has changed the situation fundamentally in this respect and that an additional solution is now available, namely to modernize and increase food production by means of industrial input, mechanized equipment as well as chemical fertilizers. But in primitive rural communities in countries where food is cheap in terms of prices of industrial goods there appears to be little incentive to use industrial inputs in agriculture. Thus the possibility of stepping up agricultural output by the introduction of modern industrial inputs cannot be realized unless a rise in agricultural prices relative to those of industrial goods is allowed to take place.

This leads on to the final question: What are the implications of the present study for the possibilities of promoting economic growth in the underdeveloped parts of the world? Can history teach us anything for the future, or has it become irrelevant under modern conditions with the possibility of using scientific methods and industrial products in the agriculture of underdeveloped countries?

It is clear that this question cannot be answered by a reference to the fact that output per man-hour in agriculture increases by leaps and bounds when industrial methods are introduced in rural communities in already industrialized countries. Similar changes raise output per man-hour much less when introduced in underdeveloped countries where rural skills and rural communications remain at primitive levels. The modest increases in output per man-hour which can be obtained by the use of industrial products or scientific methods in such communities may not be sufficient to pay for the very scarce resources of skilled labour and foreign exchange which they absorb. It seems somewhat unrealistic, therefore, to assume that a revolution of agricultural techniques by means of modern industrial and scientific methods will take place in the near future in countries which have not yet reached the stage of

urban industrialization. It is not very likely, in other words, that we shall see a reversion of the traditional sequence, in which the urban sector tends to adopt modern methods a relatively long time before the agricultural sector undergoes a corresponding transformation. Past experience may therefore still have some relevance for the planning of agricultural growth in the underdeveloped world.

Beyond Malthus
Sixteen Dimensions of the Population Problem

Lester Brown, Gary Gardner, and Brian Halweil

The demographic prospect for individual countries has never varied more widely than it does today. In some nations, populations are projected to decline somewhat over the next half-century, while in others they are projected to more than triple. But are such increases realistic? Analysis of the population problem raises doubts as to whether the expected population doublings and triplings in scores of developing countries will, in fact, materialize.

To help assess the likelihood that the increases projected by the United Nations will actually occur, we turn to the concept of the demographic transition, formulated by Princeton demographer Frank Notestein in 1945. Among other things, its three stages help explain widely disparate population growth rates. In the first of the three stages, the one prevailing in preindustrial societies, birth rates and death rates are both high, essentially offsetting each other and leading to little or no population growth. As countries begin to modernize, however, death rates fall and countries enter stage two, where death rates are low while birth rates remain high. At this point, population growth typically reaches 3 percent a year—a rate that if sustained leads to a 20-fold increase in a century. Countries cannot long remain in this stage.[1]

As modernization continues, birth rates fall and countries enter the third and final stage of the demographic transition, when birth rates and death rates again balance, but at low levels. At this point, population size stabilizes. Countries rarely ever have exactly zero growth, but here we consider any country with annual growth below 0.4 percent to have an essentially stable population. Among the earliest nations to reach stage three were East Germany, West Germany, Hungary, and Sweden, which achieved stability during the 1970s.

All countries today are in either stage two or stage three. Some 32 industrial countries have made it to stage three, stabilizing their population size. (See Table 9.1) The other 150 or so countries, including most of those in Asia, Africa, and Latin America, are in stage two. Within this group 39 countries, those that have seen their fertility fall

TABLE 9.1
Sixteen Countries with Zero Population Growth, 1998

Country	Annual Rate of Natural Increase (percent)	Midyear Population (million)
Belarus	-0.4	10.2
Belgium	+0.1	10.2
Czech Republic	-0.2	10.3
France	+0.3	58.8
Germany	-0.1	82.3
Greece	0	10.5
Hungary	-0.4	10.1
Italy	0	57.7
Japan	+0.2	126.4
Netherlands	+0.3	15.7
Poland	+0.1	38.7
Romania	-0.2	22.5
Russia	-0.5	146.9
Spain	0	39.4
Ukraine	-0.6	50.3
United Kingdom	+0.2	59.1

SOURCE: See endnote 2.

to replacement level or below, are approaching stage three. These include China and the United States, which are each growing by roughly 1 percent a year.[2]

In mature industrial countries with stable populations, agricultural claims on the Earth's ecosystem are beginning to level off. In the European Union (EU), for example, population has stabilized at roughly 380 million. With incomes already high, grain consumption per person has plateaued at around 470 kilograms a year. As a result, EU member countries, now consuming roughly 180 million tons of grain annually, have essentially stabilized their claims on the Earth's agricultural resources—the first region in the world to do so. (See Figure 9.1) And, perhaps more important, since the region is a net exporter of grain, Europe has done this within the limits of its own land and water resources. Likewise, future demand for grain in both North America and Eastern Europe is also projected to remain within the carrying capacity of regional land and water resources.[3]

Not all countries are so fortunate. Over the next half-century, India's population is projected to overtake that of China, as it expands by nearly 600 million people, compared with just under 300 million for China. Whether India—already facing acute shortages of water—can avoid a breakdown of social systems in the face of such an increase in population pressure remains to be seen.

Although there are dozens of countries that now face a doubling or tripling of population size over the next half-century, three of the more populous ones stand out: Ethiopia, Nigeria, and Pakistan. (See Table 9.2) The current fertility rate in these countries ranges from just under six children per woman in Pakistan to nearly seven in Ethiopia. By 2050, water availability per person in each of these countries will be well below the minimum needed to satisfy basic food and residential needs.[4]

The question now facing the world is whether the 150 or so countries that are still in stage two, with continuing population growth, can make it into stage three by quickly reducing births. Over the next half-century, most countries where population

FIGURE 9.1
Grain Production and Consumption in the European Union, 1960–98
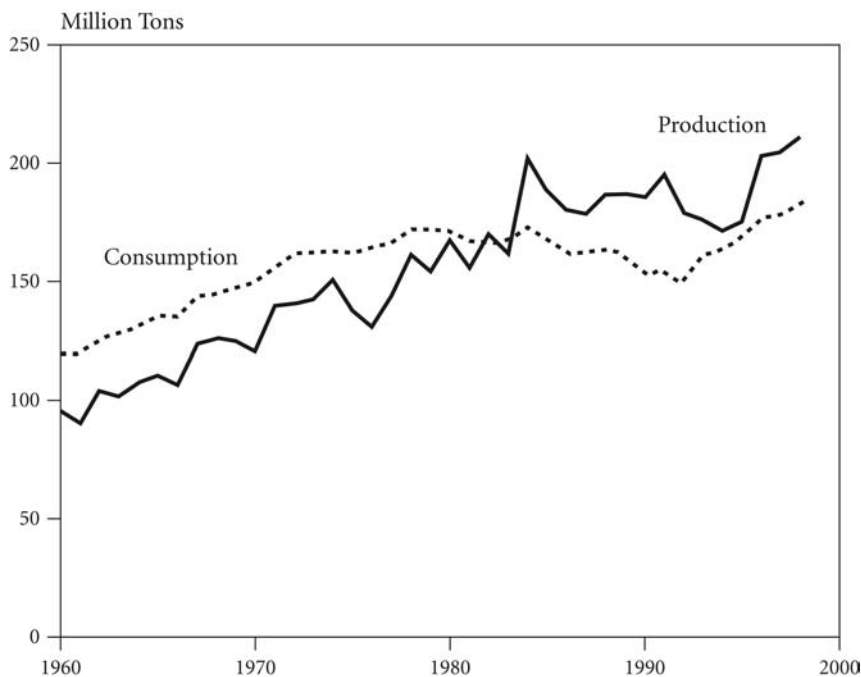
SOURCE: See endnote 3.

TABLE 9.2
Population in Selected Industrial and Developing Countries in 1998,
with Projections to 2050

Area	Population 1998	Population 2050	Increase From 1998 to 2050 (million)	(percent)
	(million)		(million)	(percent)
Industrial Countries				
United States	274	348	+74	+27
Russia	147	114	-33	-22
Japan	126	110	-16	-13
Germany	82	70	-12	-15
France	59	58	-1	-2
United Kingdom	58	59	+1	+2
Italy	57	42	-15	-26
Developing Countries				
India	976	1,533	+557	+57
China	1,255	1,517	+262	+21
Pakistan	148	357	+209	+141
Nigeria	122	339	+217	+178
Brazil	165	243	+78	+47
Bangladesh	124	218	+94	+76
Ethiopia	62	213	+151	+244
Iran	73	170	+97	+133
Congo	49	165	+116	+237
Mexico	96	154	+58	+60
Egypt	66	115	+49	+74
Tanzania	32	89	+57	+178

SOURCE: See endnote 4.

growth is still rapid seem likely to break out of stage two, achieving the demographic stability of stage three. In these nations, the combination of falling fertility, increasing incomes, and rising educational levels will lead to population stabilization within the foreseeable future. Economic and social gains and the decline in fertility will reinforce each other. This can be seen most clearly in the developing countries of East Asia, such as South Korea and Taiwan, where successful early efforts to reduce fertility set the stage for the diversion of capital from rearing large numbers of children to investment in modernization overall. The resulting improvements in living standards then reinforced the trend to smaller families.

Countries that are already pressing against the limits of land and water resources and that are faced with a projected doubling or tripling of their population may face falling living standards that will further reinforce the prevailing high fertility. This reinforcing mechanism, referred to by demographers as the demographic trap, could drive countries back into stage one.

Nations in stage two where population is still growing rapidly will thus either shift quickly to smaller families or eventually fall back into stage one of the demographic transition when their economic and social systems break down under mounting population pressure. One or the other of the two self-reinforcing cycles will take over. There are no other options. Among the many countries at risk of falling back into stage one if they do not quickly check their population growth are Afghanistan, Egypt, Ethiopia, Ghana, Haiti, Honduras, India, Myanmar, Nigeria, Pakistan, the Sudan, Tanzania, and Yemen.

Governments of countries that have been in stage two for several decades are typically worn down and drained of financial resources by the consequences of rapid population growth, in effect suffering from demographic fatigue. This includes trying to educate ever growing numbers of children reaching school age, creating jobs for the swelling numbers of young people entering the job market, and dealing with the various environmental problems associated with rapid population growth, such as deforestation, increased flooding and soil erosion, and aquifer depletion. With leadership and fiscal resources stretched thin in trying to cope with so many pressures at once, governments are often unable to respond effectively to emerging threats such as new diseases, water shortages, or food shortages. This is perhaps most evident in the inability of many governments to cope with new diseases, such as AIDS, or the resurgence of more traditional diseases, such as malaria or tuberculosis.

If these threats are not dealt with, they can force countries back into stage one. For several African countries with high HIV infection levels, this is no longer a hypothetical prospect. Although industrial nations have been able to control the spread of the disease, holding infection levels under 1 percent of their populations, governments in many developing countries—already overwhelmed by the pressures just described—have not been able to do so. For example, in Zimbabwe, a country of 11 million people, more than 1.4 million of the adult population of less than 5.6 million are infected with HIV. As a result of this 26-percent adult infection rate and the inability to pay for costly retroviral drugs needed to treat those with the disease, Zimbabwe is expected to reach population stability in the year 2002 as death rates climb to offset birth rates. In

effect, it will have fallen back into stage one, marking a tragic new development in world demography.[5]

Another situation that could easily become unmanageable is life-threatening shortages of food due to either land or water shortages or both. For example, Pakistan and Nigeria face an impossible challenge in trying to feed their future populations. The projected growth for Pakistan to 357 million by 2050 will reduce its grainland per person from 0.08 hectares at present to 0.03 hectares, roughly the strip between the 10-yard markers on a football field. Nigeria's projected growth will reduce its grainland per person from the currently inadequate 0.15 hectares to 0.05 hectares.[6]

As India's population approaches the 1 billion mark and as it faces the addition of another 600 million people by 2050, it must deal with steep cutbacks in irrigation water. David Seckler, head of the International Water Management Institute in Sri Lanka, the world's premier water research body, observes in a new study that "the extraction of water from aquifers in India exceeds recharge by a factor of 2 or more. Thus almost everywhere in India, fresh-water aquifers are being pulled down by 1–3 meters per year." Seckler goes on to speculate that as aquifers are depleted, the resulting cutbacks in irrigation could reduce India's harvest by 25 percent. In a country where food supply and demand are precariously balanced and where 18 million people are added to the population each year, the cutbacks in irrigation that are in prospect could drop food supplies below the survival level, creating a national food emergency.[7]

As noted earlier, U.N. demographic projections do not reflect the ecological deterioration and social breakdown of the sort that has led to the ethnic conflicts plaguing countries such as Rwanda and Somalia. Somalia, for example, is still treated by U.N. demographers as a country, but in reality it is not. It is a geographical area inhabited by warring clans—one where ongoing conflict, disintegration of health care services, and widespread hunger combine to raise mortality.

Exactly how the stresses of social disintegration will manifest themselves as the needs of a growing population outstrip the resource base varies from country to country. For example, Rwanda's 1950 population of 2.5 million had reached roughly 8.5 million by early 1994. A country whose agricultural development was once cited as a model for others in Africa saw its grainland area per person shrink to a meager 0.03 hectares per person, less than one third as much as in Bangladesh. In this society, which is almost entirely rural with no industrial cities to migrate to, cropland per person has shrunk to the point where it will no longer adequately feed many of those living on the land, giving rise to a quiet desperation. The resulting tension can easily be ignited—as it was when a long-standing ethnic conflict between Tutsis and Hutus broke out again in 1994, leading to the slaughter of a half-million Rwandans, mostly Tutsis.[8]

The press focused on the long-standing conflict, which was real, but what was not reported was the extraordinary population growth over the last half-century and how it was affecting the hope of Rwandans for a better future. Desperate people resort to desperate actions.

As demographic fatigue sets in and the inability of governments to deal effectively with the consequences of rapid population growth becomes more evident, the resulting

social stresses are likely to exacerbate conflicts among differing religious, ethnic, tribal, or geographic groups within societies. Among these are differences between Hindus and Moslems in India; Yorubas, Ibos, and Hausas in Nigeria; Arabs and Israelis in the Middle East; Hutus and Tutsis in Rwanda and Burundi; and many others. Aside from enormous social costs, these spreading conflicts could drive countless millions across national borders as they seek safety, putting pressure on industrial countries to admit them as political refugees.

As pressures on the Earth's resources build, they may also lead to international conflicts over shared water resources, oceanic fisheries, or other scarce resources. Nowhere is the potential conflict over scarce water more stark than among the three principal countries of the Nile River valley—Egypt, the Sudan, and Ethiopia. In Egypt, where it rarely rains, agriculture is almost wholly dependent on water from the Nile. Egypt now gets the lion's share of the Nile's water, but its current population of 66 million is projected to reach 115 million by 2050, thus greatly boosting the demand for grain, even without any gains in per capita consumption. The Sudan, whose population is projected to double from 29 million today to 60 million by 2050, also depends heavily on the Nile. The population of Ethiopia, the country that controls 85 percent of the headwaters of the Nile, is projected to expand from 62 million to 213 million. With little Nile water now reaching the Mediterranean, if either of the two upstream countries, Sudan or Ethiopia, use more water, Egypt will get less.[9]

FIGURE 9.2
World Population Projections under Three Variants, 1950–2050
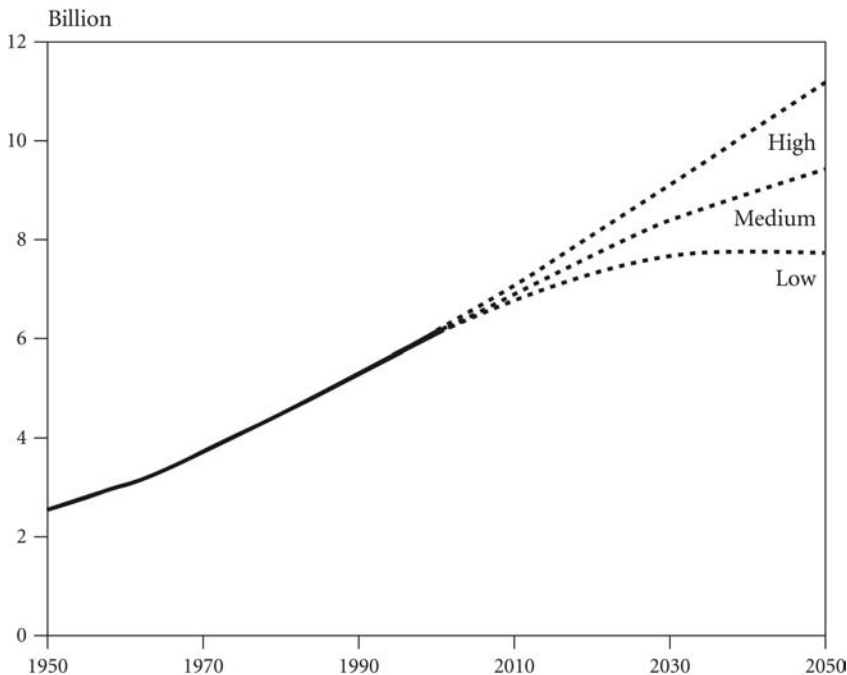
SOURCE: See endnote 10.

As we look to the future, the challenge for world leaders is to help countries maximize the prospects for breaking out of stage two of the demographic transition and moving into stage three before time runs out and nature brutally forces them back into stage one. In a world where both grain output and fish catch per person are falling, a strong case can be made on humanitarian grounds for an all-out effort to stabilize world population. There is nothing inevitable about a projected mid-century population of 9.4 billion. We can choose to move to the lower trajectory of the three U.N. projection scenarios, which has world population stabilizing at 7.7 billion by 2050. (See Figure 9.2) This would reduce the number to be added by 2050 from 3.3 billion to a more manageable 1.7 billion.[10]

What is needed, to use a basketball term, is a full-court press—an all-out effort to lower fertility, particularly in the high-fertility countries, while there is still time. We see four key steps in doing this: undertaking national carrying capacity assessments to help governments and the public at large to better understand the urgency of stabilizing population, filling the family planning gap, educating young women, and adopting a worldwide campaign to stop at two surviving children.

NOTES

1. Frank Notestein, "Population—The Long View," in P.W. Schultz, ed., *Food for The World* (University of Chicago Press: 1945); Warren Thompson, "Population," *American Journal of Sociology*, vol. 34, no. 6, 1929.

2. Table 9.1 from Population Reference Bureau (PRB), "1998 World Population Data Sheet," wall chart (Washington, DC: June 1998).

3. Figure 9.1 from ibid., and from U.S. Department of Agriculture (USDA), *Production, Supply, and Distribution (PS&D)*, electronic database, Washington, DC, updated August 1998; Mark W. Rosegrant and Claudia Rihgler, "World Food Markets into the 21st Century: Environmental and Resource Constraints and Policies," revision of a paper presented at the RIRDC-sponsored plenary session of the 41st Annual Conference of the Australian Agricultural and Resource Economics Society, Queensland, Australia, 22–25 January 1997.

4. Table 9.2 from United Nations, *World Population Prospects: The 1996 Revision* (New York: 1996), and from PRB, op. cit. note 2; Tom Gardner-Outlaw and Robert Engelman, *Sustaining Water, Easing Scarcity (A Second Update)* (Washington, DC: Population Action International, 1997).

5. Joint United Nations Programme on HIV/AIDS (UNAIDS) and WHO, *Report on the Global HIV/AIDS Epidemic* (Geneva: June 1998); Lawrence K. Altman, "Parts of Africa Showing H.I.V. in 1 in 4 Adults," *New York Times*, 24 June 1998.

6. USDA, *PS&D*, op. cit. note 3.

7. David Seckler, David Molded, and Randolph Barker, "Water Scarcity in the Twenty-First Century" (Colombo, Sri Lanka: International Water Management Institute (IWMI), 27 July 1998).

8. USDA, *PS&D*, op. cit. note 3.

9. Sandra Postel, *Last Oasis*, rev. ed. (New York: W.W. Norton & Company, 1997).

10. Figure 9.2 from United Nations, op. cit. note 4.

Reproductive Mishaps and Western Contraception
An African Challenge to Fertility Theory

Caroline Bledsoe, Fatoumatta Banja, and Allan G. Hill

Kaddy Sisay, a 30-year-old remarried divorcée, fell into a sample of women our sur-veyors interviewed in rural Gambia every month for 15 months during 1993–94. In this population where people so intensely desire children, Kaddy had carried at least four pregnancies. Three were with her first husband. The firstborn, a daughter who died before age three, was followed by two stillbirths. At this point Kaddy's marriage ended, very likely a consequence of her failure to produce children for her husband. Remarrying as the marginal second wife of a man already married to a younger woman with three children, Kaddy became pregnant for the fourth time and bore a son. Our surveyors began to interview her when the baby, still breastfeeding, was about 17 months old. Four months later, this child died. Left in a precarious marriage with no children to support her in later life, Kaddy, although she expressed a strong desire for more children, did the last thing we might expect: she began a long course of Depo-Provera injections.[1]

This example presents three apparent anomalies. We perceive high-technology Western contraceptives as being out of place: being put to use in a country whose rural inhabitants appear to have radically different ideas about reproduction from those in the West. We also see contraceptives as being used at a point in time, and for a duration, in which "child spacing" can hardly characterize the motive. Finally, we see contraceptive use in an unexpected marital context: by a wife whose future conjugal life seems to depend crucially on her ability to produce children. It is small wonder that by the fourteenth month of our survey, Kaddy's comment, recorded by the sur-veyors, was, "I am suffering in my marriage."

An outsider's first reaction might be to attribute these reported actions to data error or statistical aberration. Yet Kaddy's case, as startling as it sounds to the demog-rapher's trained ear, is not unusual for women in such situations. In our 1992 baseline survey of 2,980 women who had ever been pregnant, 150 women were using Western contraceptives. Of these, 18 percent were doing so after a reproductive mishap—a miscarriage, stillbirth, or the loss of a neonate or a young child. This 18 percent is all

the more surprising since, in a "nonlimiting" population whose members value high fertility, no one in circumstances like Kaddy's should be using any contraceptive method, at least according to the conventions by which fertility in Africa is usually analyzed. These findings on contraceptive use following reproductive mishaps, without apparent regard for its likely temporal penalties for fertility, fly in the face of every major demographic theory that has been advanced to explain fertility behaviors in Africa. They contradict any sort of child-replacement hypothesis; they also reflect efforts to "control" fertility under circumstances where a target family size can hardly have been reached. They certainly reflect circumstances that our project's earlier conclusions about child spacing as the basis for contraceptive use (Bledsoe et al. 1994) failed to consider: there is *no* child to space. Such observations seem to make no sense in a population so desirous of children.

This article shows that these very small numbers are the most striking edges of a much larger body of evidence. They suggest a convergence between conventional demographic understanding of the social and biological dynamics of high fertility and a very different framework of interpretation. The key question is not when fertility begins, the boundary that draws most demographic attention in high-fertility populations, but how it ends. We show that rural Gambians see fertility as limited by a woman's eroding bodily capacity to bear a child safely over successive pregnancy outcomes. This capacity wears out less with the passage of time than with the cumulative effects of wear and tear on the body, particularly in the wake of obstetric traumas. Since the pace of this decline can be slowed with "rest" between pregnancies (that is, the creation of recuperative space), and since time spent in "resting" is considered largely irrelevant to ultimate child numbers, it is not surprising that the most traumatic health assaults, such as those that reproductive mishaps reflect or intensify, produce the strongest contraceptive responses.

This alternative view of reproduction and aging, which we term "body resource expenditure," is consistent with findings from elsewhere in rural sub-Saharan Africa on contraceptive use, marriage, birth intervals, and men's reproductive desires. This view also appears to have figured significantly in other times and regions. It draws support from every discipline that has touched on reproduction in Africa—demography reproductive biology, medicine, anthropology, art, literature—each of which would probably claim the findings as its own "common sense": knowledge that seems so obvious it scarcely bears stating. Yet none has acknowledged this alternative view of reproduction and aging as a basis either for interpreting intentional behavior or for carrying out concerted analysis.

Understanding this alternative view requires looking through a cultural lens not only at reproduction in rural Gambia but also at the interpreting frameworks by which the population sciences have come to analyze high fertility.[2] As most of the world settles into a regime of low fertility, the science of the study of high fertility is disappearing rapidly; international medical journals now describe the predominant problems faced by older women as those of cancer and infertility. As a result, even in Africa demographic research now tends to treat contraceptives as devices to limit the number of live births, with maternal health improvements being seen as a byproduct, and contraceptive users are seen as a group apart: educated, autonomous, and nonfatalistic.

We show, however, that in contexts with high levels of reproductive morbidity and mortality, a *health* model, not a demographic one, dominates people's thinking about contraception, superseding by far any specific worries about family size. The fact that a woman's health and life are at stake—to say nothing of the wellbeing of the extant children who depend on her—means that the medicinal effect of contraceptives, which have the potential to heal by allowing recovery from traumatic pregnancy and delivery experiences, may loom larger than their fertility-reduction potentials.

It is important to stress that we are concerned here neither with fertility levels nor with fertility decline,[3] but with the *intents* with which people use contraceptives and the patterns of contraceptive use that these intents produce.[4] We see women as pointing by their contracepting actions to a dimension of human biology that has been disappearing from Western views of this matter and to ways in which they seek to shape biological outcomes. We first lay out a series of assumptions upon which contemporary analyses of fertility in developing countries have been grounded, including our project's own initial child spacing theme. Turning to some of the inconsistencies that began to emerge in the findings, in the rest of the article we set forth the alternative vision and adduce social and cultural evidence for it.[5]

Key Assumptions in Studies of Contraception and Fertility

Most Western women, when asked how many children they want, produce a clear numerical response. By contrast, Gambian women frequently respond, "Whatever God gives me" or "Ask my husband" (for a related discussion, see van de Walle 1992). Indeed, the testimonies of subfertile women suggest that they are far from happy with their divine allotment, while those women who received a bounteous number probably would have liked even more. In such populations, the most obvious question is not the one that policymakers typically ask: "Why do they want so many children?" Rather, it is "Why don't they have more?"[6] For contemporary studies of developing countries, the answer to this question has centered on two assumptions: (1) live births, if not surviving children, are the only meaningful units of fertility analysis, and (2) time imposes the ultimate check on both completed fertility and fecundability. Expressed in the numerator as live births over a specified amount of time in the denominator, the elements in this expression are set against the countdown to what is seen as the ultimate limit to fertility: menopause.[7] These convictions are so taken for granted that they are seldom articulated: certainly they infused every aspect of the Gambian project's original formulation.

The Study

Our study took place in the North Bank area of rural Gambia. Its first phase consisted largely of a 1992 baseline fertility survey, carried out in 40 villages, of 2,980 women of reproductive age. The study also included several hundred pages of open-ended interviews and field notes. Like most of sub-Saharan rural Africa, the population of rural

Gambia is one that demographic convention would confidently label a natural fertility population. In our study region, ever-married women had one of the highest total fertility rates in the world, 7.5 children per woman, with no signs of major change over a long period.[8] Birth intervals averaged around 2.5 years, and contraceptive use rates were very low. Only 5 percent of women under age 45 were using a Western method of contraception, mostly oral contraceptives and Depo-Provera. (National levels, which include urban areas, are slightly higher; Republic of The Gambia 1993.) As for methods usually termed "traditional," few women report using herbs. Far more use "juju," a small leather pouch sewn tightly around pieces of paper containing secret texts from the Qu'ran. There is widespread skepticism about the efficacy of juju, but women readily use it if nothing else is available or if other methods fail or cause complications. Abstinence is frequently reported as a contraceptive measure, although "avoiding the husband" (the way our survey phrased the query) often consists simply of a reduction in the frequency of sexual "contacts," so as to reduce the risks of a mistimed conception. A few larger towns have hospitals that can perform cesarean sections. Twenty-one women in our 1992 sample (1 percent) reported that they had been sterilized surgically, a procedure that can now be performed at the regional and district health center, with the husband's permission.

Members of the three major ethnic groups in the region (44 percent Mandinka, 36 percent Wollof, and 20 percent Fula) engage in agriculture and herding; only 3 percent of ever-married women had been to school. Most women were married (88 percent), 58 percent of them polygynously, and most had married quite early, around age 16, though the beginning of their sexual relations may be delayed for another year or so until the young wife is "transferred" formally to her husband's compound. Mean age at first birth is 18.4 years. In their husbands' compounds, women seek to establish their security and to gain a competitive edge over present and future co-wives and sisters-in-law by bearing a number of children, especially sons, who will retain rights of residence and inheritance in the compound and will eventually take over its leadership roles. Once marriage begins, birth intervals take on a classic natural fertility pattern of around 2.5 years (A. Hill 1997; C. Hill 1994). After her reproduction is finished, a woman usually tapers off the frequency of sexual intercourse or ends it altogether, an event that may or may not coincide with becoming a grandmother, though terminal abstinence is usually explained in these terms.

The first phase of our study established that birth intervals in this high-fertility population may be regular, but they are hardly natural, at least in the sense of being untouched by human intentionality. The study also indicated that it was less useful to see contraceptive users in static terms, as a discrete group whose background characteristics set them apart, than as the tip of a moving wave of numerous *temporary* users who were simply using contraceptives for small slices of time to space their births—especially in cases where women deemed that their fecundity had resumed before their child was ready to be weaned. Most "acceptors" rapidly, and predictably, became "non-acceptors" (and vice versa) over the sequence of pregnancy, lactation, and weaning. The rationale given in virtually all cases was not an intent to limit births but the wish to protect the health of the children and the mother (Bledsoe et al. 1994; see also Lorimer 1954; Caldwell and Caldwell 1981; and Greene, Bankole, and Westoff 1997).

Women's efforts to monitor birth intervals and to space births at safe intervals are so strong, because of both individual volition and fear of social sanction, that one might well conclude that birth intervals themselves, not numbers of children, are the focus of the calculus of conscious choice (cf. Coale 1973: 65).

The second phase of our study was intended as a time to fan out the investigation in a more open-ended fashion, to enrich the information on child spacing and contraceptive practice. Its principal instrument was a 15-month multi-round survey, conducted in 1993 and 1994, administered each month to some 270 women in eight of the 40 villages surveyed in the first phase who had had a pregnancy in the last three years.[9] This multi-round design was employed to ascertain changes in postpartum sexual, reproductive, and contraceptive patterns more accurately than a cross-sectional survey would allow. The rounds contained a core fertility questionnaire, including quantifiable questions and several open-ended follow-up questions, and a longer open-ended question that varied each month.

Our analytical effort at this point was enhanced by the use of a computer software program, Epi Info, whose data entry and analysis features can be exploited for exploratory analysis in ways that exceed those of a typical statistical program. They do so by allowing quantitative data to be sorted and scrutinized in several ways, and against the template of the survey form into which individual women's answers can be read. Epi Info can also juxtapose open-ended commentary as variables alongside the quantifiable responses, allowing people to explain in their own words their answers to key questions. For example, the yes/no question "Last month did you want to get pregnant?" can be followed by "Please explain"; and "What means to avoid pregnancy did you try last month?" can be followed by "Why did you use this method [or nothing]?" The cases can then be sorted by age, number of pregnancies, or type of birth control, and the transcribed explanations can be studied. The combined effects of commentary variables plus quick access to full view of all the questions facilitate a search for unanticipated associations among variables.

Reproductive Mishaps and Contraceptive Use

The project's second phase, because of its intense focus, brought to light some inconsistencies in the earlier results. One challenge was to better understand differing male reactions to contraceptive use. Throughout sub-Saharan Africa, men have a longstanding reputation as obstructing women's use of family planning. Yet the men in our surveys were hardly uniform on this question. Some men expressed moral outrage at the notion of family planning; and stormy arguments can arise when a husband discovers his wife's secret cache of tablets or hears from an indignant older female relative that his wife was seen in the family planning clinic. Other men were not only enthusiastic backers of their wives' contraceptive use; they saw *themselves* as "spacing" births by agreeing to abstinence, by using condoms, or even by taking their wives to the village health worker to obtain pills. Still, if contraceptives were simply being used to ensure children's health by safe birth spacing, there should be no male opposition to contraceptive use.

The two areas containing the most striking inconsistencies, however, were those that have remained farther from the gaze of population studies: the behavior of women nearing the end of reproductive life and the behavior of those who had experienced a reproductive mishap.

The early reproductive years have attracted the most demographic attention because of the fertility implications of early marriage among a highly fecund age group (e.g., National Research Council 1993b). Older women's low fertility rates, whether produced by declining fecundity or by terminal abstinence, have almost completely marginalized this group as an object of interest in high-fertility populations. Their behaviors and commentaries diverged far from what investigators might expect in such a population.

As either a natural fertility or a child spacing framework of analysis would anticipate, many women were anxious to resume childbearing around weaning time as long as they could avoid overlapping children, one in the womb and the other nursing. This definition of child spacing followed the most salient local usage, although it departed from the more standard one: the use of contraceptives now although more children are wanted later (e.g., National Research Council 1993a). Among the women with weaned children whom we interviewed in monthly rounds, those who stated that they did not want to be pregnant at the moment were older (31.9 years) than those who did (29.9) (N = 659; p <.01). Clues to this older/younger distinction were found in the expanded commentary responses. When asked, "Are you trying to take a 'rest' between your births?" (that is, to create longer spaces between weaning one child and conceiving the next), young women (under age 25 in this particular sample) offered comments like these:

— I love having children.
— My husband wants more children.
— I want more children so I want as soon as my child is weaned to get pregnant one month after weaning.
— I did not reach the age of delaying my pregnancy because I only have 3 children.

On the other hand, what stood out in the responses of many older women, even among those wanting more children, was a determination to "rest": to slow the pace of childbearing by delaying a new pregnancy past the point when the previous child is weaned. These women were in their mid-30s or older:

— I want to delay the next pregnancy because I am weak and want to wait until I have a little strength again.
— I don't want to have a child anymore. I want to rest now and take care of my present children.
— My womb is now slight [weak, thin] and I delivered my present child in [the capital of] Banjul [i.e., a high-risk case].
— I am not well.

As such responses suggested, young women, with their youthful reserve of strength and health, seem to recover quickly from a birth. In contrast, many older women, though their fecundity might be ebbing, were actively trying to *create* wider birth

intervals than child health alone demanded. Finding their strength increasingly hard to regain after each successive birth, they expressed fears of the rising health risks that can accompany high-parity childbearing: complications of labor, hemorrhage, and death. Whereas younger women preferred pills and traditional contraceptives that did not appear to jeopardize their fertility, older women were much more frequent users of the long-lasting Depo-Provera. They also spoke with considerably more favor about the prospects of the husband marrying a co-wife than did younger ones; many older women took matters into their own hands to launch the search for a new wife for a diffident husband.[10]

While "child spacing" was beginning to erode as a satisfactory explanation of the project's findings on use of contraception, one of the most obvious new inconsistencies surrounded the linguistic distinction between "old" and "young." Many women who were only in their mid- to late 30s reported in the 1992 survey that they were "too old" to have another child. While such reports might be explained as indicating cases of premature terminal sterility, several of these "too-old" women were having regular menstrual periods and a number were using long-term contraceptives. Several were even breastfeeding at the time of the survey. Such responses suggested that Western concepts about age and reproduction in a high-fertility society bore little resemblance to the forces at work here.

Older women, then, were more anxious than younger ones to stop or delay childbearing by using effective, long-acting contraceptives, and men sometimes manifested outrage at what seemed to be women's efforts to ensure the health of their children. But the domain of inconsistencies that posed by far the most troublesome stumbling block for the child spacing model of contraception was the fact that in a number of cases, there *was* no last child. Selecting only users of Western contraceptives in our multi-round sample and examining their characteristics and comments drew attention to women who were contracepting in the wake of a reproductive mishap. Such cases had been ignored in the earlier phase of the project by adherence to prevailing disciplinary practice, which counts only live births as significant data and focuses on intervals in which a child has survived.

Taking women under age 45 in the 1992 survey whose last pregnancy had ended after 1987 (within the last four-plus years; N = 1,756), Figure 10.1 displays patterns of contraceptive use (Western or traditional) according to the status of the woman's last pregnancy: a child currently breastfed, weaned, or deceased; or an outcome other than live birth. The results are displayed in histogram format to convey how very small are the numbers of women reporting mishaps compared to other women.

Among the most numerous group, breastfeeding women, just under 6 percent were using Western contraception; another 6 percent were using traditional contraception. Among women whose last child was weaned, 7.6 percent were using Western contraceptives, probably those who, as we saw in the quotes above, were "tired" and wanted to "rest". The bars of central interest, however, are the two small sets on the right. They show not only that there were cases of contraception after reproductive mishaps but that the proportion of such cases was unexpectedly high, particularly after miscarriages and stillbirths. The proportion of women using some form of contraception in the wake of a miscarriage or stillbirth (nearly 14 percent in all) was greater than that

Women under age 45 using Western or traditional contraception according to the status of last pregnancies ending January 1988–April 1992
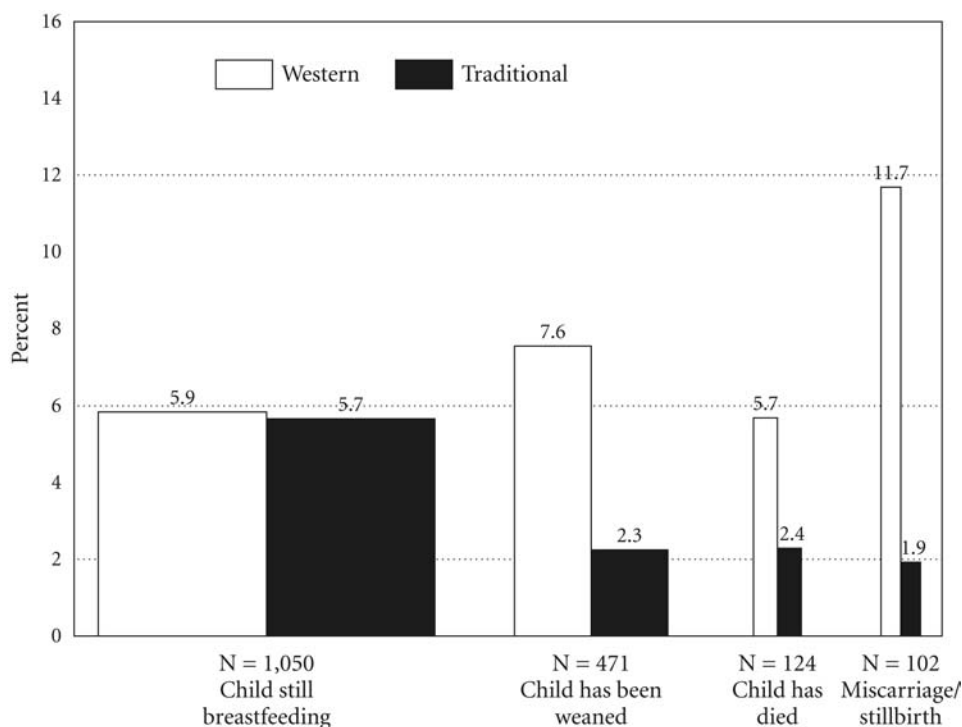
for any other group, including the women using contraceptives to avoid pregnancy during breastfeeding, the only pattern of contraceptive use one might have expected to find under our original definition of child spacing. Given our emphasis on the tight time frames in which contraceptive activity usually occurs, the four-plus-year interval to which the data shown in Figure 10.1 refer is somewhat longer than the "normal" birth interval sequence. Yet even with a shorter time window up through 1990, miscarriages and stillbirths remain consistently the most common post-pregnancy context for contraceptive use, never descending below 11 percent. The methods these women were using are even more telling. While half of the breastfeeding women who were using any method were using Western contraceptives, very few women contracepting after a miscarriage or stillbirth were relying on traditional measures like juju or herbs. Like Kaddy Sisay, whose case introduced this article, they were using strong, "effective" methods;[11] the proportion of Western contraceptive users among women whose last pregnancy ended in a miscarriage or stillbirth, almost 12 percent, exceeds that associated with any other outcome.

Figure 10.2 examines the phenomenon from another angle. Removing all constraints of age and time elapsed since the end of the last pregnancy, it shows that at each number of pregnancies the percentage of women with at least one completed pregnancy (N = 2,466) who are using Western contraceptives is consistently higher

FIGURE 10.2

Percentage of women using Western contraceptives by prior experience of live births versus miscarriages/stillbirths
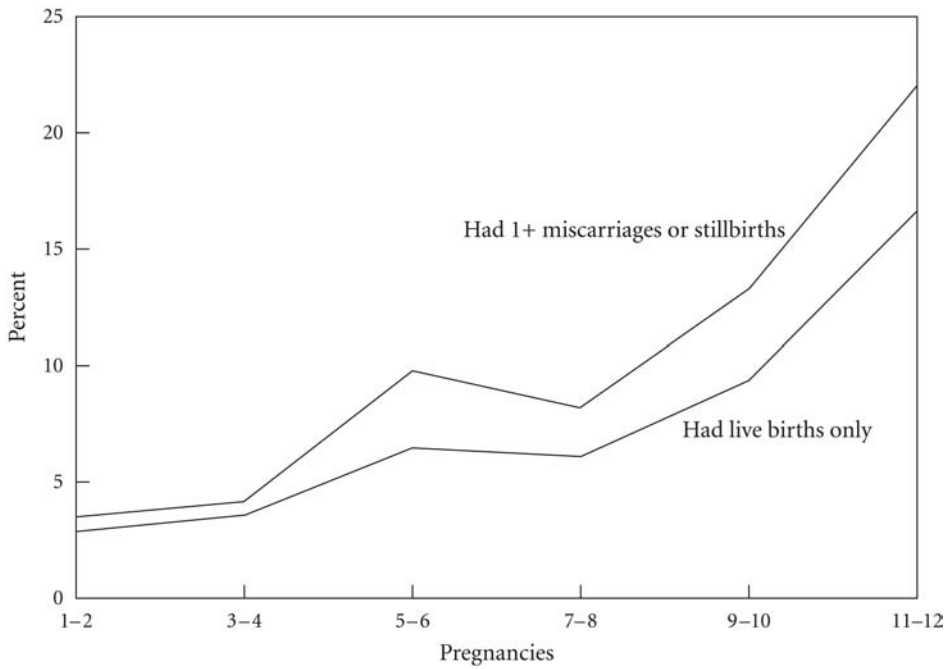
source: North Bank survey, 1992

among those who have had one or more miscarriages or stillbirths than among those who had only live births. Though separated at the low pregnancy numbers by less than one percentage point, the disparity rises to 6 percentage points by pregnancy numbers 11 to 12.

Figure 10.3, taking only women who have had two or more pregnancies, the last of which produced a child that is still alive (again free of age and time constraints), shows that the effects of miscarriage or stillbirth reverberate throughout reproductive life. Among women with few pregnancies, those whose last pregnancy resulted in a child that is still alive are more likely to be using a Western contraceptive if they had only live births than if they had one or more miscarriages or stillbirths. Among women with four or five pregnancies, however, the pattern shifts decisively. Even though women with one or more miscarriages or stillbirths are likely to have fewer surviving children than those whose pregnancies all resulted in live births, women with any outcomes other than live birth are more likely to be using Western contraceptives than those with only live births. Like the previous figure, this one suggests that the effects of such events on contraceptive use, whether they occurred recently or in the distant past, operate with increasing intensity as the number of pregnancies rises.

Although the patterns are both clear and consistent, the actual numbers, especially of women reporting that their last pregnancy ended in a miscarriage or stillbirth, are very small. Once the effects of other factors such as age and number of pregnancies

FIGURE 10.3
*Percentage of women whose last child still alive using Western contraceptives by prior experience
of live births versus miscarriages or stillbirths*
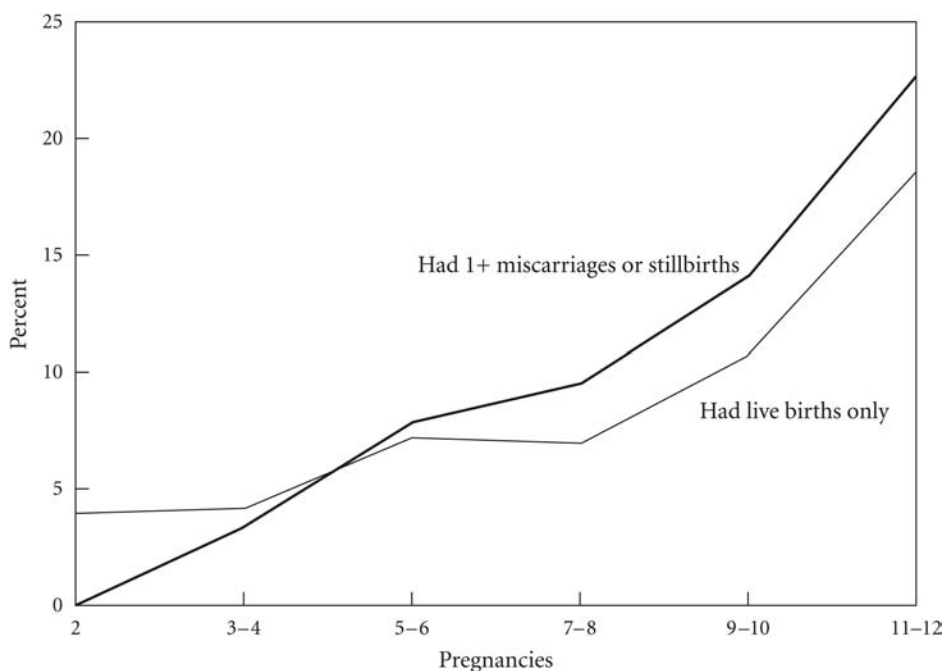
SOURCE: North Bank survey, 1992; women with 2+ pregnancies.

are controlled, logistic regression analysis reveals no significant differences in the type
of contraceptive use between women who have had a miscarriage or stillbirth and
those who have had only live births. Yet although the small number of cases could be
confounding these results, the fact that anyone in this population was contracepting
after such an event warrants investigation. Out of the 2,980 women in the 1992 survey,
only 25 out of the 1,823 whose pregnancies had ended within the last four years were
using some form of contraception after experiencing a mishap.

Conventional fertility analysis, assuming contraceptives to be methods for limiting
the number of children (and determining that there is no last child in these cases),
might suggest that these women have reached a desired number and are trying to stop
childbearing. However, very few of these contracepting women have particularly suc-
cessful fertility records. Out of their collective 149 pregnancies, only 53 percent have
survived as living children. Only six women have more than four surviving children—
five of these women aged 40 years or older. Out of the 24 women with two or more
pregnancies, 17 had lost at least one other pregnancy besides the last. Yet even among
these most unlikely of contraceptors, several stand out: (1) the seven women with the
last two or more immediately preceding pregnancies lost, six of whom were using a
Western, rather than a traditional, contraceptive; (2) one of the 25-year-olds, using
Depo-Provera, who had lost all four of her last pregnancies; only her first child had
survived; (3) a 36-year-old, also on Depo-Provera, with eight pregnancies, seven of

which were lost, including the last two; (4) the two youngest women, ages 18 and 19, both with no surviving children. The 19-year-old was one of nine women in the whole survey using two Western contraceptives simultaneously and by far the youngest; she was also the only woman in the survey to be using an IUD.

Although some of the older women with high numbers of pregnancy losses command the most immediate attention, the most unexpected may be these last two women, both under age 20. Together, they comprised two out of the only three teenagers in the entire survey (the total number of women below age 20 was 589) who were using Western contraceptives;[12] the third teenager was breastfeeding a baby.

Why Focus on Such Anomalies?

Despite the problem of small numbers, similar increases in contraceptive use after miscarriage or stillbirth occur throughout the data sources: the monthly rounds, the 1994 followup survey, and case material on women who were not from the study area. Still, most women in our study population are not currently using contraceptives, and most pregnancies do not end in mishap. Why, then, turn attention to such anomalies? The answer is that they shed new light on the logic that underlies postpartum fertility behaviors in general. The key lies in the power of the counterintuitive logic itself: if contraceptives are being used simply for child spacing, to ensure an adequate period of breastfeeding before weaning, then there is no reason why they should be used after a reproductive mishap.[13] Women who were trying to have a child but failed should be most anxious to start again and the least likely to be using any contraceptives, especially very "effective" ones. Rather than seeing these anomalies as statistical "proof"— which they are not—they should be seen as highlighting the aberrations, almost any one of which should call into question aspects of the dominant theory concerning child spacing and contraceptive use. The fact that this contraceptive behavior is occurring *more* frequently after reproductive mishaps than among women with other pregnancy outcomes should be grounds for a major rethinking.

The post-mishap contraception cases, along with the other anomalies highlighted above that *are* more statistically noteworthy (male reactions to contraceptive use, differential use rates in contraceptive methods among women of different ages and number of pregnancies, and incongruous declarations of fecundity status), raise serious doubts not only about the analytic framework concerning child spacing with which our project began but also about much more fundamental assumptions underlying time as the basis of fertility analysis. To be sure, age data are often unreliable in rural Africa. Still, great leaps of the imagination seem necessary to explain why women like Kaddy Sisay should be letting time, their most precious resource, slip away as they return for dose after dose of Depo-Provera.

If age has never been questioned as the basic analytic category, what about fertility itself? Mainstream anthropology, to its disadvantage, has been largely indifferent to questions concerning the number of children women have. Both demography and anthropological demography, however, have largely taken as given that that number is the key fertility question, especially the number of surviving children. What would seem to make no sense at all, then, are remarks like those of 32-year-old Oumie

Dibba. Oumie reported five pregnancies: one was a miscarriage, and she also suffered a child death, leaving her with two boys and one girl. Reporting that she was nearing the end of her childbearing years "because of many pregnancies and too much hard work," she declared that she was nonetheless "tied" to the compound—that is, she felt secure and was committed to its future welfare:

> The number of children I have borne in this compound makes me feel "tied." I have 5 children with this husband: 2 died and 3 are alive. … I'm more tied than my co-wife because she has only 2 children and I have 5. (Round 13)

The temptation of a Western observer would be to summon the surveyor who recorded this response and dispatch her back to the field to resolve the numerical inconsistencies. But taking the quote seriously raises a critical question: are *live* births the sole units of reproductive currency? If not, then, what *are* people counting?

The Rural Gambian Fertility Framework

The use of effective, long-acting contraceptives toward the end of reproductive life might suggest that many women are trying to limit the number of their children, a pattern that fertility transition watchers might seize upon. Yet there is a critical distinction to make here. "Avoiding pregnancies" is not necessarily the same thing as "limiting the number of children." Efforts to unravel the logic embedded both in the commentaries and in the numbers began to reveal the contours of an alternative perception of fertility. This alternative view converges in some areas with the child spacing and natural fertility frameworks. But in overall shape and thrust, it is radically different from both.

Reproductive Endowment

Rural Gambian logic sees the fundamental unit of fertility calculation as neither a live birth nor a surviving child but a "fetus" (*harijeo*) or "potential," of which every woman is considered to have a pre-endowed number. "*Hapo*" literally means an "amount" or a "number" of anything from mangoes to kilograms of rice. When applied to fertility, it refers specifically to what might be called an "endowment," the number of potential reproductive outcomes or fetuses that God has given a woman to bear throughout her life. The *hapo* incorporates both live births and non-surviving fetuses, and it stands independently of the number of pregnancies required to produce this total number of fetuses. A statement from a 24-year-old woman illustrates this conviction: "I would have any number [of children] that God gives me. The number of children that everyone will have since when he created us and whatever the case may be, everyone will get that number." Each fetus, whether it is born as one of a pair of twins or is miscarried, represents one constituent from this total endowment.

How many children will a particular woman have? No one knows how large her endowment is until it is exhausted. Some women have large endowments; some have very small ones. A few tragically have none at all. What everyone *does* know is that

although a woman cannot end up with any more surviving children than her God-given endowment, she can certainly end up with fewer. If she is lucky, all of her fetuses will be born as live children and will survive to maturity. More likely, some of these fetuses will be lost before being born, and some of her live-born children may die. Thus, a woman's family elders or in-laws may pray for God's blessing, asking him to bestow many children on her, a practice recorded in innumerable ethnographies of African populations. Yet they are not asking God to increase her total endowment. This would be presumptuous, even blasphemous. Instead, they are asking God to allow each of her fetuses to result in a child who survives. Because reproduction is not limited by time but by one's endowment, a woman with an endowment of nine fetuses who has had her pregnancies in close succession will finish childbearing well before a woman with the same nine fetuses but lengthier birth spacing.

Westerners would likely see the ex post facto attribution of child numbers to divine will as highly circuitous reasoning. Certainly the notion of a pre-endowed number of potential fetuses is something Western scientists would be reluctant to accept. It would be mistaken, however, to dismiss the entire framework as superstition and to abandon pursuit of the cultural logic before asking how, precisely, God's will is said to be enacted. Whereas Western culture gauges the limits of reproduction by the passage of time, the rural Gambian view of reproductive senescence holds that the number of God-given fetuses a woman will realize as miscarriages or stillbirths, as sickly infants, or as children who survive and prosper is contingent on her eroding bodily capacity to continue bearing and caring for children. Involved are concrete anatomical and physiological processes to which rural women are finely attuned, though their vocabularies and frameworks of understanding do not coincide precisely with those in the counterpart domains of Western science.[14] This section presents the local "ethnophysiological" understandings, though the Western analogues are in many cases quite apparent. Most salient in women's fertility calculations are worries about their bodily resources—muscles, strength, and blood.

Muscles. The basic physical component of reproductivity is translated loosely as "muscles" (*faso*; literally, "sinews"), a metaphor that may refer to what Westerners call "muscle mass" or "muscle tone." Muscles are said to be "cut" or "reduced" (*kuntu*) during grueling physical exertion such as farm work. In the local understanding, this refers to a "wearing out" by repeated, stressful use. The analogy of an elastic band is often used to describe how muscles, so taut and strong in a young person, grow irreversibly slack with repeated stretching and straining.[15] The most taxing event by far for women's muscle strength is pregnancy termination. One woman, who had undergone three deliveries, explains in graphic detail:

> Concerning muscle reduction, after each pregnancy it is true, because of the severe pain and the strong muscle contraction. During this contraction all muscles opened wide in order to give enough space for the baby to pass through. The space from womb to the birth canal is very tight and it needs to be widened for the baby to pass. (field notes)

Reproduction is seen less as additive within a fixed time limit, as Western analysis tends to depict the process, than as subtracting from a physical base. Both men and

women enter their early years of preadult life at about the same time: what they call their "twelve" ("12 years old"), a lively, exuberant phase of boundless youthful energy. Men are said to remain in their "twelve" as late as age 30 or so. Although a few women who have excellent health and ample domestic support may remain in their "twelve" for some time, reporting no discernible muscle loss, most say, again metaphorically, that they lose one muscle during each pregnancy termination. For a strong, healthy young woman, the toll she feels from a normal childbirth will be slight. The "older" (more worn out, tired) she becomes, the more likely she is to feel the toll. Most women's "twelve" dissipates rapidly, usually beginning its descent by age 20, because of the precipitous loss of muscle in childbirth. Difficult deliveries are especially costly to muscles; some people contend that giving birth to boys, who are said to be larger than girls, and possibly more stubborn, "cuts" two muscles. After the first child, giving birth usually becomes relatively fast and easy. At some point, though, it becomes dangerous again because of the loss of muscles over successive pregnancies.

The most extreme manifestation of muscle loss is having a "deep womb": thinly stretched by successive fertility events, it has lost the power to expel a fetus. Using the metaphor of a well in the arid Sahel, a woman described this wearing, subtractive process: "For every birth the stomach [womb] is scooped and it eventually deepens. The older the well the deeper it becomes and the more difficulty in drawing water from it" (Round 6). It is still possible to conceive with a "deep womb," but everyone recognizes this as a dangerous state; the body has lost its ability to expel a fetus. For women whose deliveries become longer and more painful, more time is required for recovery. At some point, a woman realizes clearly that she is *sarifo* ("spent"[16]). She might be able to conceive and bear another child or two, but at risks she knows have now risen sharply. God's will cannot be known until reproduction is finished, but it certainly becomes much clearer as the end approaches.

As muscles reach their end, the body becomes "worn out" (*koto tale*). Translated literally as "old" or "aged" (thus, *muso koto*: "old/worn out woman"), this implies having flaccid muscles; wrinkled, sagging flesh; and dry, flaky skin.[17] As used here, the word *koto* implies that one has come to this condition because of childbearing. For women, being "old" therefore has special meaning: childbirth is so taxing that women who have suffered more difficult pregnancy and childbearing ordeals, especially if these ordeals are closely spaced, become "old" more quickly than those who have not. They become "old" not simply in reproductive function but in physical appearance well before their male age peers.[18] Such perceptions are reflected in men's comments about their wives. In one of the male surveys, men were asked if they planned to marry another wife. Yes, said a 46-year-old man whose 38-year-old "spent" wife had had ten pregnancies: "Because she is getting old, and I am still young." Yes, also, said another man, aged 48: "Because you know a woman and a man are different in getting old easily."

Strength. Like muscles, strength (or "power"—*sembo*; most closely translated as "energy") is lost gradually over time, especially during times of physical stress such as the hunger season, just before the harvest. Like muscles, strength is lost particularly during childbirth. But unlike muscles, which can only decrease, strength can be replenished with rest and nutritious foods such as meat and chicken.[19] It never again,

however, rises to the level of one's "twelve." Dipping and surging over the life cycle in an overall downward direction, strength is life itself. When all strength fades, whether slowly or abruptly, life ends.

A woman with an ample diet and abundant help for child care and farm work will probably have easy births because she can regain her strength readily. An undernourished woman, who alone must tend to her husband as well as elder in-laws and small children (including visits to distant clinics for routine well-baby checks and emergency treatments), while she tries to keep pace with heavy farm work and earn a small cash income by walking several miles to sell vegetables, will find it increasingly difficult to withstand the strain of childbirth. In her tired, weakened state, one difficult delivery will sharply escalate the risks of another one the next time. It will also drain her strength, forcing her to use more of her reserves of muscles during labor and delivery, and she may lose two muscles rather than one during the next delivery. Thus, although muscles are the primary locus of reproductive capacity, strength is far more prominent in everyday conversations about fertility. The reason, apparently, is that the ultimate quantity of muscles is not only unknown but fixed, so it is the gain or loss of the more contingent element, energy, that determines how, or even whether, a woman will be able to use all her muscles.

Blood. Blood (*yelo*) is the third principal component of a woman's reproductive potential. Having sufficient blood is critical for maintaining strength. Yet blood is also needed to make a baby, and the process of giving birth is considered to be a major cause of blood loss for a woman, particularly when intensified by hard work and inadequate diet. Being pale and listless, a state frequently compounded by one of the world's highest malaria levels, is an ominous sign that a woman is unprepared for the next pregnancy and birth. At risk is not only her own safety but that of her baby, who may be born sickly and die. Such problems are intensified because blood, unlike strength, is replaceable only with great difficulty. (Menstruation is considered draining to women; this is expected and is considered normal, although abnormally heavy or lengthy menstrual periods provoke worry about blood loss.) The ferrous sulfate and folic acid tablets now given to pregnant women in family planning clinics are considered poor substitutes; the only sure way to replace blood is transfusions. Because the blood donated to one person is blood lost to someone else, however, even close relatives donate to each other with great reluctance—a pattern long noted throughout most of the region.

The basic constituents of reproduction—muscles, strength, and blood—operate in a close bodily synchrony, particularly during childbirth and its aftermath. Such interactions among bodily resources determine both how quickly a woman can safely spend her reproductive endowment and how many of her fetuses will survive to birth and to healthy maturity. Whereas it is impossible to tell by looking at a woman whether her "endowment" is gone, losses of strength, muscles, or blood are apparent to the astute eye. The main points here are two: (1) Fecundability is seen as only one of a number of factors that determine a woman's ability to reproduce, and often a comparatively minor one. (2) Senescence, whether that of one's reproductive capacity or of the body

overall, occurs during wearing life events. The decline of body resources may occur slowly and steadily, or in sharp, unpredictable drops interspersed by long, steady progression. The pace depends on an individual's life circumstances.

It is important to reiterate that these are local descriptions of reproductive dynamics. However, many of their links to what various Western disciplines would recognize as scientific "facts" are quite close, a circumstance that makes these cultural tenets all the more convincing, given the inevitable difficulties in translation and in interpreting the metaphorical quality of some of the vocabulary in which they are expressed.

The Medical Significance of Mishaps in the Body Resource Framework

While a woman fully expects to expend all her reproductive capital eventually, she prefers to do so through normal childbirth events. What she most fears is prolonged, injurious deliveries: in particular, those that fail to produce living children and are themselves destructive of reproductive capital. Mishaps can be both cause and consequence of traumatic pregnancy outcomes. A mishap may be caused by (among other things) overly frequent childbearing ("rampant" births), a heavy workload, a shortage of blood, or simply being very tired. If the womb is not well, the pregnancy cannot survive. A reproductive calamity may thus reflect an underlying health problem. Alternatively, it may so badly deplete a woman's body that it precipitates another mishap the next time, especially if she has had no opportunity to recover. Physically traumatic pregnancy outcomes are in any case considered *more* costly than normal births to a woman's reproductive capacity.

Giving birth to a stillborn child (*siiringo*) is often described as extremely difficult. A living baby makes small movements that render every push of the mother more effective in dislodging it, but a stillbirth can exact enormous muscle tolls during attempts to expel a large, inert fetus; and many women, particularly those who undergo stillbirths after many pregnancies, describe acute, prolonged suffering.[20] A miscarriage (*wulu* ["delivery"] *kurong* ["extremely taxing"]) is quite different. Using an analogy of the locally ubiquitous mangoes, a village traditional birth attendant vividly captured the miscarriage experience. When a ripe mango is picked, the fruit snaps off the dried stem easily, its life moistures sealed intact on both sides of the break: the tree and the fruit. Trying to pick an unripe mango is quite a different experience. The fruit can be pulled off the green stem only with determined force. Once it is finally torn off, both the mango and the tree undergo a dramatic, sustained loss of fluid. The same is said to occur with a miscarriage: since the fetus is not yet a discrete entity, it is essentially a piece of the woman—her own flesh—that is being torn out, causing great pain, heavy blood loss, and possibly internal damage. A woman can even bleed to death. Induced abortion is abhorred for precisely these reasons. It can do great damage, to the extent that the woman may even destroy her future fertility potential, if not her life. Although some miscarriages are experienced simply as late menstrual periods (and although some women even attempt to induce "late" periods—Levin, forthcoming), those attempts that occur further into the pregnancy, but before the fetus becomes distinct from the mother, are considered especially hazardous. The knowledge that schoolgirls sometimes induce abortions in order to avoid expulsion may in some

cases underlie families' decisions to withdraw from school a girl whose academic attentions seem to be straying. Both stillbirths and late miscarriages entail labor pains, and a late miscarriage, like a stillbirth, "cuts" at least one muscle, sometimes more. Yet so feared is the bloody loss of flesh that a miscarriage and its aftermath can be considerably worse. By contrast to a stillbirth, in which all the tissues and fluids are expelled, the effects of a miscarriage may leave residual infections, and the damage may heal slowly.

In sum, while Western fertility analysis effectively treats miscarriages and stillbirths as events that take up time in a birth interval, Gambian women see outcomes other than live birth as causing *more* harm than live births and even as reducing their overall fertility potential. Although God may have endowed a woman with eight pregnancies, the experience of two miscarriages may leave her so drained that she is able to produce only four of the eight as live births. Moreover, a series of difficult births can exact a disproportionate bodily toll: they can make her look, feel, and behave as if she were much older than her actual age would suggest.

Body Resource Expenditure

Although a woman's greatest resource at the outset of her adult life is her body's capacity to reproduce, everyone recognizes that she will eventually grow old and lose her reproductive potential. The question is *how* she will do so and with what results. While biology lays the groundwork for how the mechanisms of aging and reproduction play themselves out, the social and economic environment determines the success with which an endowed reproductive potential can be realized.

Among the domains that this view of fertility most vividly illuminates is that of women's relations to men and in-laws. Reproductive "struggle" cannot be considered independently of its intended beneficiaries. A woman is seen as expending (as expressed in Fula, "to dry" or become thin) this resource on behalf of those who are supporting her: her husband and his family. As a young bride, she is admonished that she must "struggle" in the husband's compound. To the degree that she works hard and manages to have children, especially sons, she will succeed in establishing "roots," a Fula expression, which anchor her firmly to the compound and its future. Posing an abstract question such as "How many children do you want?" makes no sense to her without reference to a specific man. Such a query is understood as an implicit question about the state of her marriage.

Physically, a woman will be "spent"—weak, thin, and haggard—when she finishes childbearing. Her muscles will be gone, and she may well be anemic from the cumulative stresses of childbearing and illnesses, especially malaria. Now is the time her children and husband should rally and nourish her. Whereas her muscles cannot be replaced, her body fat will be restored and her skin will regain a glow. She can begin to sit back and enjoy the fruits of her labor, living in the gratitude of her husband and children. She may be sent by her sons to Mecca, returning to start a market business with capital they provide her, and moving into a managerial, consultative role in the compound. Any ailments she has will be treated immediately; her grown children will

hire a taxi to take her to the clinic or even to Banjul, and they will purchase any necessary medicines. This implies that much of old age can be a time of leisure, rest, and freedom. Certainly it can be a time of far better health than she suffered during the harsh struggles of her childbearing years.

The sub-fertile age peers of the mother of many children may look and feel younger than she does; they may even live longer. She, however, has exchanged her youth for children—by far the preferred option. No one would prefer the fate of a long life of barrenness to a possibly shorter, but far happier life of a woman whose "heart is at rest." (Of particular note in this idiom is the cultural equation of "rest" with "happiness.") Old age, even more clearly than the ethnographers of Africa have realized, is considered a *bodily* achievement, especially for women. Becoming "old" in the service of the husband's family by such a visible "struggle" and "sacrifice" is one of life's most honored achievements.

The body expenditure ideology, however, confronts a woman with a paradoxical dilemma. She needs children, but should her marriage go sour or her husband prove "useless," her body will have been spent on a dead–end relationship and her income on its progeny. An educated woman with wide contacts in the international development field expressed the predicament as "*maternal depreciation*." Although she may have been alluding to "maternal depletion," her own phrase captured far better the combined economic and medical plight of a woman who must watch each longed-for pregnancy result in a mishap or a child her husband does not support. In such a situation, each pregnancy devalues her cumulatively and makes divorce increasingly unfeasible. Eventually, to make ends meet, she may try to suspend childbearing until she finds a better man. Her own family members, since they will likely bear the brunt of the support for her children, are likely complicit. Scolding her for "delivering for nothing," they may demand that she stop having children. They do *not* mean, however, that she should stop altogether but that she should reserve her remaining endowment for someone else.

What about (to adapt an old demographic concept) the "value" of mishaps? Women's ways of demonstrating wifely virtue are not limited to childbearing or to rearing a child successfully, although these are by far the most desirable outcomes. Simply getting pregnant periodically, even if some of these pregnancies eventually go wrong, is a key sign that a marriage is on track. The most tragic case of all is a woman who has never had a pregnancy, not even a miscarriage, her youth suspended in an eerie agelessness. Fearing such stigmas, barren women sometimes go to the clinic seeking medical verification that they have had a miscarriage so they can report to their husband that they have at least been pregnant. (For descriptions of treatment of infertility and miscarriages in The Gambia, see Skramstad 1997 and Sundby 1997.)

Preventing Reproductive Mishaps and Mitigating Their Effects

Although the odds seem set against them, Gambian women are far from helpless in the face of forces that deplete their bodies and depreciate their value as wives. Large numbers of living children are highly desirable. Yet women's efforts to realize their

physical capacities reflect wide scope for individual action. A woman gains cognitive skills that enable her to mitigate body expenditure. She learns to read body signs: her own and those of her co-wives and daughters-in-law. As she advances in number of pregnancies, she tries to eat energy-rich foods and to reduce heavy work to preserve her muscles for their remaining reproductive ordeals. Above all, she tries to monitor her bodily decline and to avoid pregnancy when her body is unprepared.

In such contexts, the patterns of contraceptive use following reproductive mishaps, so counterintuitive to Western beliefs about the dynamics of high fertility, make good sense. Since the principal roadblock to having as many children as God gives is not time but a deficit of body resources, the best strategy in cases of traumatic reproductive mishaps is not to rush ahead and waste a precious pregnancy out of one's remaining endowment; rather, it is to slow down and wait for the body to heal the damage that pregnancy and childbirth can inflict. So damaging are such mishaps, especially to reproductively "old" women, that these women may actually welcome the long-term effects of Depo-Provera, something that most younger women just beginning their childbearing careers avoid at all costs. A "spent" woman may try to wait as many as three or four years before seeking another pregnancy.

While women suffering a recent miscarriage or stillbirth are likely to use contraceptives until their bodies heal, contraceptive users with many pregnancies whose last-born child is still alive, yet who have had one or more miscarriages or stillbirths in the past, would seem to have less cause to delay a new pregnancy; for this reason, their cases are perhaps the best evidence of the validity of our alternative analytic framework. For such a woman, this experience can reflect a trauma of such magnitude that it may affect how she manages her subsequent reproductive life. Thirty-seven-year-old Fanta Juwara had carried seven pregnancies, of which five seemed to have survived, including the last. Despite all these pregnancies, the one stillbirth remained vividly inscribed in her memory as she recalled her ordeal and its debilitating effects:

> The stillbirth I had was more painful than all my births because I did not deliver that one with life. He was dead inside me so I had to use all my power to push him out. If he had been alive he would be moving himself as I pushed but that was not the case. Because of that trouble over strength, my husband wanted me to rest for two years before I got pregnant again. I did not take any medicine to avoid pregnancy [because the husband was away most of the time] but I was washing [treating] my stomach with local and *toubab* [modern/Western] medicine because my stomach was not well then. When I felt my stomach was well enough to have another child I got pregnant and my husband left again. (field notes)

Yet without doubt, the starkest case among all the women from whom we have commentary is that of Kaddy Sisay, whose case began this article. With no surviving children after several pregnancies, Kaddy had begun Depo-Provera injections as soon as her last remaining child died, apparently just after she was interviewed in Round 5. She next appears in Rounds 7 and 10 with comments like these:

> My stomach is in pain when blood is coming out. I would like to have a rest because I always have difficulties when breastfeeding. I want to have a rest. [I am using] injection to delay pregnancy because I always have problems while pregnant. (Round 7)

I used to suffer a lot before I delivered. I used to have 5 days in labor or more. I want to rest and also to regain my strength. I am afraid of labor. Since I started childbearing I always have difficulties before delivery. I am forgetful; therefore the pills which require everyday attention are not suitable for me. I take the injection once every three months, which is very convenient for me. (Round 10)

Kaddy's difficult fertility history is undoubtedly responsible for her conjugal troubles in her second marriage. Thus, although Kaddy wants more children (in Round 12 she expressed a desire for four more), it is not clear that she wants them with her present husband: "I am suffering in my marriage. I think I do not want a child here anymore. I do not talk to him [her husband] about it" (Round 14). Kaddy's most telling response, however, was her answer to a query about which of Islam's tenets are important for women and how she tries to observe them:

A woman is ordained by Allah to follow the orders, advice, and wishes of her husband. A good Muslim woman should not refuse to have contact with her husband when requested, and should also bear children for him. As said by the Holy Prophet, the best among his people is the one that increases the number of his people, because in the day of judgment he doesn't want the people of other prophets to be more numerous than his own. I encounter a great difficulty in following these rules. I was following them all along, but since I started bearing children, I suffered a lot during my pregnancies and much more in labor, because in each delivery, my people thought that I would die, yet none of these children are alive. Now I am using family planning to prevent pregnancy in order to regain my strength, power, and health. Though my husband does not like it, I am using it for prevention. (Round 11)

Rethinking Fertility, Time, and Aging

How do these new understandings about reproduction and senescence help to clarify some of the puzzles with which this article began? To start, why are so many women reluctant to give a numerical answer to the question of how many children they want? The answer becomes clearer if we recognize that, in our rural Gambian setting, the overriding fertility question throughout a woman's reproductive life is not how many children she wants but rather how much of her God-given endowment she will be able to realize as living children. Thus, the question is probably being interpreted as a query about the "amount" or "number" of potential children with which a woman has been endowed. Although she may insist that she wants as many children as God gives her or may simply refuse to give a number, responses connoting superstition or fatalism, further probing reveals that it is primarily younger women who give this answer.[21] Because a woman cannot know before she is "spent" what her potential is, it hardly makes sense to ask her how many children she wants. To a young woman, this is an entirely open question, the answer to which she can only glimpse as her marriage and fertility trajectories take more visible shape.

As to the notion of time and its relationship to fecundity and aging, worries about menopause or the effects of time rarely appear in women's narratives of their fertility histories. While these facts seem to defy common sense in a society so desirous of

children, the logic that now emerges reveals that fecundity—and even "aging" itself—are seen as having little to do with what Western society refers to as "age." Western assumptions posit that the countdown to menopause is a time-dependent event and that this countdown poses a growing threat to a sub-fertile woman as time elapses. By contrast, rural Gambians see reproduction, particularly the stresses of labor, as eroding body resources. In fact, whereas menopause certainly terminates the possibility of reproduction, reproduction, in aging the body, may precipitate menopause. Because a woman who has lost all her bodily reproductive resources is deemed to be "old," it is not surprising that many women who by Western standards might be judged young in years claimed to be "too old" to bear children, often drawing attention to their aged appearance. In terms of the endowment/body expenditure view of fertility, a woman who survives to age 70 could have been "old" for over half of her life.[22]

Clearly the case of a rural Sahelian country is an extreme one. Here, where fertility reaches one of its highest peaks in the contemporary world, women must reproduce under conditions of sparse obstetric care, recurrent malaria, and intense work and nutritional stress. Yet it is precisely such factors that make this a critical case for challenging Western science's confidence in the time-bound nature of reproductive capacity. Under these conditions, a woman's bodily potential is very likely to be expended quickly, a fact that renders both the duration of birth intervals (assuming they are not excessive) and the timing of menopause largely irrelevant to ultimate child numbers. Since the anatomical and physiological limits of the body will undoubtedly be reached before any temporal boundary, time can even be an ally: moderate attempts to stretch birth intervals can aid attempts to achieve a large family size.

As for the often-perplexing male perspective on reproduction, the issue has usually been cast in dichotomous terms: men either support or do not support contraceptive use. Seeing reproductivity as a potential to be realized rather than a time-bound capacity helps to explain why men—and their elder female kin—sometimes object strongly to the use of contraceptives, and why women's health can be such an inexplicably volatile domestic issue. If a young contracepting woman were locked into a time-bound framework, she would be depriving herself of children as well as her husband. But since the limit is not one of time, she has much to gain if she withholds pregnancies from him in order to reserve them for someone else, possibly by feigning tiredness or exaggerating the severity of an illness. Once the question is posed as one of contraceptive use not to "limit" children but to "space" them and to spare worn out wives, men voice almost uniform support for contraception.

The chief value of the body expenditure thesis is that it explains many behaviors that previously eluded explanations except fatalism or lack of education. If the two cultural logics, Gambian and Western, are placed side by side, the grounds of disagreement become clear. Westerners would see the notion of God's will and of reproductive outcomes whose numbers cannot be known in advance as manifestations of superstition in societies labeled as traditional. Gambian women, however, if someone were to explain to them the parallel Western beliefs about reproduction, would probably find the reduction of fertility to a time frame as begging the question. That is, since the validity of the notion of time is taken as given in the question about fecundity, women's answers cannot be phrased in meaningful ways. People are not confused by

the concept of age or of chronological time or with the notion that body processes transpire at a certain average temporal pace. Under the conditions Gambian women experience, attempting to force the notion of a highly contingent reproductive capacity into a fixed temporal frame would make no sense.

Placing Western and African beliefs about fertility side by side exposes the biological facts that Western society has taken for granted to the same tests and skepticism to which African theories have long been subjected. It is not at all clear that the Western view would prevail.

NOTES

1. The interview rounds indicate seven months of Depo-Provera coverage, but data entry for the last two months was incomplete.

2. Demography is the focus of this article because it is the discipline in which contemporary Western assumptions about age and reproduction have shaped some of the most sophisticated analytical tools for the measurement of fertility; see, however, a parallel analysis of sociocultural anthropology, in Bledsoe with Banja (1997).

3. On this subject, see Caldwell, Orubuloye, and Caldwell (1992); Mason (1997); Cohen (forthcoming); Lockwood (1996).

4. The question of how people count children and reckon fertility lies outside the scope of this article. For an attempt to use the Gambian findings to revisit the question in the context of contemporary cultural views of reproduction and contraception in the United States, see Bledsoe (1996).

5. In the cases and quotes, names have been changed to preserve anonymity, and surveyors' English transcriptions are lightly edited for better comprehension. Unless otherwise stated, all local terms are in Mandinka, the language of the largest ethnic group in the area.

6. This question has inspired seminal demographic work in other pre-fertility transition contexts (e.g., Bongaarts and Potter 1983; Coale 1986). Related questions have been addressed in other fields such as anthropology, microeconomics, obstetrics, and reproductive biology. In the case of evolutionary biology, see Blurton-Jones (1986); Pennington and Harpending (1988); Kaplan (1994); and Calder (1984). This article recognizes the intrinsic importance of empirical findings stemming from studies in evolutionary biology, although it stops short of drawing any conclusions for natural selection or reproductive fitness. It also posits active, conscious efforts to influence biological outcomes in ways that have lain outside the thrust of work in this field. (See, however, Irons 1983: 204–205.)

7. For facility, this article uses the term "menopause" to refer both to the end of the menses and to the premenopausal decline in fecundability, which may predate menopause by several years. Wood (1994: 414) underscores the paucity of research on the causes of the timing of menopause.

8. The Gambian census of 1993 reported a decline in total fertility of some 6 percent (Sonko 1995; Republic of The Gambia 1997).

9. The analysis drawing on the multi-round survey data represents numbers of events, not individuals. Thus, several individuals appear only once, while a number of women are represented as many as 13 times.

10. Cases of sterilization were largely lost from view. Because the study was designed largely to examine birth intervals among still-fecund women, the rounds, on which much of the second part of the study was based, focused only on women who had had a live birth in the last

three years. Since this strategy selected heavily for unsterilized women, we have no commentary from sterilized women describing why they took this measure.

11. As for the three cases of sterilization observed, two instances occurred after a miscarriage or stillbirth and the third after a live birth. While there is no way to tell why these measures were taken—whether voluntarily to limit the number of children or as a result of life-saving measures during an obstetric emergency—the proportion of women using Western contraceptives after a miscarriage or stillbirth is 10 percent, still higher than use following any other outcome.

12. There is some possibility that the miscarriages or stillbirths these young women reported were actually induced abortions, in which case their subsequent contraceptive use might imply that they were simply trying, as many urban teenagers do, to delay childbearing. Both of these women were married, a fact that diminishes the abortion possibility but does not eliminate it.

13. In theory, a contracepting woman whose pregnancy ended with a miscarriage or stillbirth could have been attempting to space a previous live birth: by inducing an abortion in order to continue breastfeeding her previous child. However, no women in the 1992 survey whose previous pregnancy resulted in a still breastfeeding living child was contracepting after a reported miscarriage or stillbirth.

14. We are grateful to Medical Research Council physician Elizabeth Poskitt in The Gambia and to nurse-midwife Patricia Woollcott (Evanston, Illinois) for Western scientific perspectives on some of the materials in this section.

15. There is considerable Western scientific support for these notions. In the womb of a young woman, the fetus is observed to lie upright, well-supported by taut muscles. With a multipara, the uterine muscles have slackened and the fetus tilts forward, increasing the risk of a breech presentation or the initial emergence of a limb. Uterine muscles and ligaments are tight at the outset of reproductive life, but they become increasingly slack as they are torn or stretched irreversibly over multiple births. This is true particularly of the abdominal wall, the rectal sphincter, and the anterior vaginal wall.

16. We are grateful to Carla Makhlouf Obermeyer for noticing this word's likely Arabic origin (*sarf*) and to John Hunwick for pointing out its likely subsequent West African transformation through vowel additions.

17. Parfait Eloundou-Enyegue (personal communication) reports a similar linguistic phenomenon in Cameroon; the verb *teg* in Ewondo is used to mean to "age," "wear out," or "soften."

18. Patricia Woollcott lends support to this observation, based particularly on her experience with high-parity Orthodox Jewish women in Illinois.

19. "Lack of strength" might be interpreted as maternal depletion syndrome, in which a woman who has finished breast-feeding is unable to replenish her nutritional reserves to prepregnancy levels, particularly when births occur in rapid succession or seasonal hardships are imposed by work, hunger, or disease. (See, for example, Miller, Rodríguez, and Pebley 1994; Miller and Huss-Ashmore 1989; Winkvist, Rasmussen, and Habicht 1992.) The Gambian notion of reproductivity, however, subsumes this realization as one of several key components that determine both the course of reproduction and its end. Ben Campbell (personal communication) believes that the concept of maternal depletion, though it is usually applied to the loss of energy reserves from fat and body weight during each birth interval, can also apply to the cumulative net energy/body expenditure over the lifetime. As for muscle loss, this may also decline over the adult lifespan, but perhaps to an extreme degree in West Africa where protein intake is often inadequate and fertility is high.

20. Patricia Woollcott finds this description at odds with her experience in the United States, where a stillbirth usually causes no more difficulty than a normal birth. She speculates that a stillbirth may produce a hard labor in cases where the fetus may have been dead for

some time and the head, which may have begun to decompose, has become pliant, making it difficult to deliver the shoulders. A letter written in the early part of the twentieth century to the Women's Co-operative Guild (1916: 85) in England by a woman describing a stillbirth lends support to both sides: "the birth … was harder than usual, as a live baby helps in its own way. The baby had gradually died after the flooding [probably hemorrhage], and had been dead more than a week at birth."

21. Round 12, containing a special add–on survey to address the body expenditure thesis, showed that women who, by self-assessment, were not yet "spent" were willing to leave the matter of additional children up to God in 40 percent of cases, while only 8 percent stated they wanted no more children. "Spent" women, however, yielded to God or gave no number in only 22 percent of cases. Nearly half (48 percent) said they wanted no more children.

22. See Munn (1992) and Gell (1992) for thought-provoking cultural analyses of time.

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Gender, Population, Environment

Sally Ethelston

Miriam lives with her family in Manshiet Nasir, originally a squatter settlement at the foot of Cairo's Muqattam hills, now largely a brick-built community of small apartment buildings and box-like single family homes. Most now have piped-in water and electricity. Her family is one of the thousands of *zabbaleen* (garbage collector) families comprising a large Christian minority among Manshiet Nasir's mostly Muslim residents. They live in a two-story, warehouse-like structure perhaps 25 feet high and about 20 feet square. Off to the side of the main living space, a narrow room has just enough space for a loom; a walled-in area behind the house is home to the family's 18 pigs.

Miriam is 17, and not yet married. What distinguishes her from many of her neighbors is the loom in her home, and the fact that she is literate in Arabic and beginning to learn English. Walking through the neighborhood, Miriam is an enthusiastic guide to her community—pointing out a recycling workshop housing a machine for crushing plastic for re-use, the veterinary clinic established by the *zabbaleen* association, and a daycare center for young children.

Through a convergence of local community activism and international assistance, the *zabbaleen* and other residents of Manshiet Nasir have witnessed some important changes in their lives. Improved pumping systems ensure that a majority of residents have access to potable water; immunization campaigns have all but eliminated tetanus and other vaccine-preventable diseases among women and children. Tacit government recognition of the settlement means that residents can, in effect, buy and sell property. Voluntary organizations such as the Association for the Protection of the Environment (Gama'at himayat al-bi'at min al-talawuth) sponsor projects for women that combine teaching functional literacy with ways of earning money—thus the loom in Miriam's home.[1]

Despite these improvements, Manshiet Nasir is still an urban environmental nightmare. *Zabbaleen* women sort through the garbage collected by their husbands and children with bare hands, fearing that gloves will slow down their work and add to their onerously long day. And the refuse of modern-day Cairo—replete with deteriorating batteries, broken glass and hospital waste, mixed in with the food waste that

goes to feed the pigs—poses a great threat to public health. Among the tasks assigned to children is the disassembling of used plastic syringes from Cairo's many hospitals.

Any garbage that cannot be reused in some way ends up back in the Manshia's narrow pathways until it is taken to be burned. It covers the asphalt and mud streets with a thick, soft and often slippery layer of trash. Inadequate sewage systems overflow frequently, further endangering the health of residents.

Manshiet Nasir can be viewed as one extreme of urban environmental hazard in the Middle East and North Africa. The Manshia reflects social, economic and demographic trends and circumstances common to most countries in the region: rapid population growth and increasing urbanization; scarcity of land, water and other economic resources; and limits on women's social and economic autonomy.

Many governments in the region view one or even all of these factors as obstacles to economic and social development, but often their policy responses have been ambivalent. Programs aimed at slowing rates of population growth have tended to focus solely on female reproductive behavior through the provision of modern contraceptives, paying far less attention either to men's roles in reproductive decisions or to women's other health needs. In addition, governments often fail to take into account other factors that influence women's reproductive choices, such as their education, job opportunities and overall status.

Equally important is the failure of some governments to persuade their citizens that slowing population growth has benefits for them as individuals. Few have effectively communicated the extent of natural resource limitations in the region. And citizens' general alienation from their political systems reinforces their suspicions that efforts to slow population growth are merely another way in which governments seek to protect the lifestyles of wealthy elites by reducing pressures to achieve greater social and economic equity. "Why is it easier to insert Norplant in a woman's arm than to tell a man in Mohandissin not to drive his Mercedes?" asks Aida Seif al-Dowla, a founding member of Al-Mar'a al-Jadida (New Woman), a research and study center.[2]

In some countries, such a politically provocative question is hardly ever raised. For the oil-rich states of the region, high rates of population growth (above 3 percent in most cases) have been viewed as satisfactory by governments eager to meet the demand for labor but ambivalent or even opposed to increased women's work outside the home. This view persists despite very real natural resource constraints. In Saudi Arabia, Bahrain, Qatar and the United Arab Emirates, per capita annual availability of *renewable* fresh water is less than one-third of the 1,000 cubic meters regarded as a benchmark of water scarcity.[3]

Beyond the limited availability of cultivable land and fresh water, the degradation of existing resources is a problem throughout the region. Concentrations of air pollutants such as sulfur dioxide (in Istanbul) and lead (in Cairo) are well above the levels considered safe.[4] Water pollution is also a serious problem due to industrial wastes, agricultural pesticides and other chemicals. The quality—and thus the productivity—of agricultural land is threatened by salination, which is a consequence of the expansion of irrigated agriculture in countries like Egypt and Iraq.

Awareness of these environmental problems is growing in the region, according to Mustafa Tolba, the former head of the UN Environment Program and now the

Population Trends

Countries	Population Mid-1994	Natural Increase (annual %)	% Age < 15 yrs.	% Married Women Using Contraceptives	
				Total	Modern
Algeria	27.9	2.5	44	36	31
Bahrain	6	2.4	32	54	30
Djibouti	6	3.0	41	—	—
Egypt	58.9	2.3	40	47	45
Gaza	7	5.0	60	—	—
Iran	61.2	3.6	47	—	22
Iraq	19.9	3.7	48	18	10
Israel	5.4	1.5	31	—	—
Jordan	4.2	3.3	41	40	27
Kuwait	1.3	3.3	43	35	32
Lebanon	3.6	2.0	33	—	—
Libya	5.1	3.4	47	—	—
Morocco	28.6	2.3	40	42	36
Oman	1.9	4.9	36	9	8
Qatar	5	1.0	23	26	24
Saudi Arabia	18.0	3.2	43	—	—
Somalia	9.8	3.2	47	—	—
Sudan	28.2	3.1	46	9	6
Syria	14.0	3.7	48	—	—
Tunisia	8.7	1.9	37	50	40
Turkey	61.8	2.2	35	63	35
United Arab Emirates	1.7	1.9	32	—	—
West Bank	1.4	4.0	50	—	—
Western Sahara	2	2.8	—	—	—
Yemen	12.9	3.4	51	10	6
Comparative Countries					
Mexico	91.8	2.2	38	53	45
Pakistan	126.4	2.8	44	12	9
United States	260.8	0.7	22	74	69
Zimbabwe	11.2	3.0	48	43	36

SOURCE: *1994 World Population Data Sheet,* Population Reference Bureau, Inc., Washington DC.

president of a non-profit environmental consulting firm. "Developing countries no longer see concern for the environment as a luxury," says Tolba.[5] And environmental "problems" are being defined more broadly to encompass such concerns as health, bad housing and poor sanitation.

Yet teaching alternate, more environmentally sound behavior is extremely difficult, according to Emad Adly, Secretary-General of the Arab Office for Youth and the Environment. "You can't ask people to dispose of garbage properly if there's nowhere to put it; you can't really talk about water conservation without the technology to make it happen; and you can't buy healthy food if it is not on the market. The fact is that there are few alternatives to the way most people currently live their lives."[6]

At the international level, as awareness of the challenges posed by population growth and environmental degradation has increased, so has concern for how linking the two might affect women. Particularly troubling is "the implication that women are responsible for environmental degradation as long as high fertility rates are viewed as a significant cause of environmental pollution." Such a perspective reduces choices of family planning "to a means to an end rather than a legitimate end in itself."[7]

These concerns provoked sharp debate at the forum of non-governmental organizations (NGOs) held concurrently with the 1992 UN Conference on Environment

and Development in Rio de Janeiro. By the time of the summit, population had been downgraded from primary importance to a number of "cross-cutting" issues; and the Vatican, with the help of a few countries, succeeded in weakening Agenda 21's language on family planning such that the word "contraceptive" never even appeared. At the NGO forum, those gathering in the Planeta Femea (women's tent) went back to the beginning to ask: Is there a causal relationship between population increase and environmental deterioration? Given the emphasis of many developing countries' family planning programs on numerical demographic goals, rather than on the right of individual women and men to plan their families, would a framework linking population and the environment further strengthen the emphasis on top-down, coercive population *control*? For the majority of those attending the discussions, the answer was yes.

Two years after Rio, the International Conference on Population and Development (ICPD) is taking place in Cairo. Focusing on population and sustainable development, the ICPD reflects many of the concerns raised by women in Rio, and includes a much greater emphasis on women's needs and aspirations. The ICPD's draft Programme of Action's more holistic approach acknowledges that population, reproductive rights and health, gender equality, the environment, and development are inseparable.

Moving beyond "family planning" is a recurrent theme of the articles in this issue of *Middle East Report* [September–October 1994] Philippe Fargues posits changes in population structure and inter-generational and gender hierarchies as sources of social change. Challenging the accepted wisdom regarding the Arab world's demographic explosion, Fargues argues that the demographic transition to lower fertility in the region is, for the most part, well under way. The crisis is social and political, not demographic.

Homa Hoodfar notes the success of Iran's government in communicating the relevance of the population issue for that society, the international community, and individuals. At the same time, she emphasizes the contradiction between the government's programmatic emphasis on female contraceptive methods and its reluctance to grant greater freedom and decision-making authority to women.

Nonprogrammatic factors affecting reproductive attitudes and behavior are also the focus of Youssef Courbage's essay. He calls attention to how varying patterns of international migration have led to the "diffusion" of contrasting norms of ideal family size, which is also being affected by labor force participation of women.

Back in Manshiet Nasir, Miriam is part of the changes in the hierarchy Fargues describes. By learning to read and write, she has already gone far beyond her parents. With an independent source of income, her role in such decisions as who she will marry and how many children she will bear will be much stronger than her mother's. And her travels outside Manshia—made possible by the association in which she is emerging as a leader—are expanding her perception of the possible.

Yet the interventions that have helped bring some change to Miriam's life do not come cheap. While the preparatory process for Cairo has helped resolve some of the political tensions evident in Rio, the issue of resources remains problematic: will those with greatest control over the world's wealth be willing to make available even the

limited funds explicitly called for in the draft Programme of Action—$17 billion by the year 2000, one-third of which is slated to come from donors? Reflecting on progress since the Earth Summit—and other international conferences going back almost 20 years—Mustafa Tolba, for one, has his doubts.

"The Rio conference called for a total of $725 billion, $600 billion of which is to come from developing countries and $125 billion in aid," he recalls. "What is available now? The Global Environmental Facility has gone from just $1.3 billion to $2.0 billion in three years—an extra few hundred million. And the same will happen in Cairo. Money, where will it come from and where will it go? The fact is we, as an international community, are not serious. If all the resolutions, declarations, and action plans promulgated and adopted had actually been translated into deeds, we would not have environmental problems. Instead, we have an environmental crisis."

Effective change also carries a political price tag. While NGOs are expected to play a key role in pushing forward the agenda that emerges from Cairo—as they have in Manshiet Nasir—they cannot substitute for government action. "Everyone is putting great hope in the role of NGOs, but it's too much," says Aida Seif al-Dowla. "They are not an alternative to a corrupt government that consistently seems to prove that it doesn't really care about the well-being of its people." Following the Cairo Conference, with all its extravagance and whatever the merit of its proclamations, the task of pushing the process of change in the face of existing hierarchies of wealth and power will remain.

NOTES

1. For a more complete account of both the history and the health profile of Manshiet Nasir, see Belgin Tekçe, Linda Oldham, Frederic C. Shorter, *A Place to Live: Families and Child Health in a Cairo Neighborhood* (Cairo: American University in Cairo Press, 1994). See also Marie Assaad and Nadra Garas, "Experiments in Community Development in a Zabbaleen Settlement" *Cairo Papers in Social Science*, Vol. 16 Monograph 4, Winter 1993–94 (Cairo: American University in Cairo Press, 1994).

2. Interview, June 1994.

3. For more on Saudi Arabia's water resources and the concepts of water stress and water scarcity, see Robert Engelman and Pamela LeRoy. *Sustaining Water: Population and the Future of Renewable Water Supplies* (Washington, DC: Population Action International, 1993).

4. WHO/UNDP. *1992 Urban Air Pollution in Megacities of the World* (Oxford: Blackwell, 1992).

5. Interview, June 1994.

6. Interview, April 1994.

7. Susan Cohen, "The Road from Rio to Cairo: Toward a Common Agenda," *International Family Planning Perspectives*, Vol. 19, No. 2, June 1993, p. 61.

The Environment as Geopolitical Threat
Reading Robert Kaplan's "Coming Anarchy"

Simon Dalby

Population, when unchecked, increases in a geometrical ratio. Subsistence increases only in arithmetical ratio. A slight acquaintance with numbers will show the immensity of the first power in comparison of the second.

By that law of our nature which makes food necessary to the life of man, the effects of these two unequal powers must be kept equal.

This implies a strong and constantly operating check on population from the difficulty of subsistence. This difficulty must fall somewhere and must necessarily be severely felt by a large portion of mankind. (Thomas Malthus)[1]

Every explosion of social forces, instead of being dissipated in a surrounding circuit of unknown space and barbaric chaos, will be sharply re-echoed from the far side of the globe, and weak elements in the political and economic organism of the world will be shattered in consequence. (Halford J. Mackinder)[2]

It is time to understand 'the environment' for what it is: *the* national-security issue of the early twenty-first century. The political and strategic impact of surging populations, spreading disease, deforestation and soil erosion, water depletion, air pollution, and possibly, rising sea levels in critical overcrowded regions like the Nile Delta and Bangladesh—developments that will prompt mass migrations and, in turn, incite group conflicts—will be the core foreign-policy challenge from which most others will ultimately emanate, arousing the public and uniting assorted interests left over from the Cold War. (Robert D. Kaplan)[3]

Once Again, the Malthusian Spectre

Robert Kaplan's cover story in February 1994's *Atlantic Monthly* magazine painted a particularly depressing picture of the future. In 'The Coming Anarchy' he argues that much of the world is on a path to violence-ridden 'anarchy', where states collapse and private armies and organized crime establish themselves as effective local administrations. In Mackinder's terms, he clearly suggests that the explosion of demographic and environmental forces has already shattered the weak parts of the political and economic organism. The natural environment is the key villain in the piece. Its degradation has, he argues forcefully, set off a downward spiral of crime and social disintegration in many places. This slide into chaos is spreading. What is now the case in West Africa will soon spread further as environmental problems generate further migration to urban areas in the underdeveloped world, resulting in more social disintegration and ethnic conflict. These issues will become the national-security issue for the United States in the next century. The natural environment is thus specified as the threat of the future.

While Kaplan's article generated an angry response from readers who contested his specific accounts of various countries in the letters pages of subsequent issues of the magazine, the themes he wrote about clearly resonated with contemporary American angst about crime, environmental deterioration, and the lack of clear direction to post–Cold War security and foreign policy planning. His very rhetorically powerful analysis is a high-profile public articulation of contemporary neo-Malthusian themes in post-Cold War geopolitical discourse.[4] It parallels much of the rest of the US media coverage of Africa, and Rwanda in particular, in its representations of Africa as a place of 'tribal', 'hostile', 'violent' Others.[5] It is notable for its pessimism, forceful prose, and the absence of any suggested substantive political remedies for the immanent dystopia.

But Kaplan is not alone. Readers of contemporary international-relations literature, foreign-policy journals, and magazines of popular political discussion, in particular in the United States, have noted that there has been a revival of interest in the themes that concerned Britain's first professional academic economist.[6] Thomas Malthus, the country parson who is widely memorialized for his pessimism about humanity's lot, a fate due largely to our supposed predilection for breeding faster than we can improve our capabilities to feed ourselves, is again in vogue in post–Cold-War policy discussions. But his theories are often now linked to themes of environmental degradation and to some of the traditional themes of geopolitics in popular policy and political discussion.

Against the backdrop of the major United Nations conferences on environment and development in Rio de Janeiro in June 1992, and on population issues in Cairo in September 1994, none of this renewed concern with population as a political factor is perhaps very surprising. But when this theme is linked, as it explicitly is by Kaplan, to the more general concerns about environment as a 'security' threat, these arguments become important in the political processes of foreign and security policy formulation in states in the 'North'. Foreign and security policy prescriptions depend in part on how the questions of appropriate policies are practically understood within the larger geopolitical discourses and their interpretations of contemporary geopolitical

order.[7] The same is true of environmental themes in international political discussions and policy formulation.[8] The recent academic discussions of the links between environment and security have been suggesting that these matters are complex and unclear, and that simple assumptions about the interconnections between environmental factors, population, and conflict need careful evaluation that is sensitive to specific geographical contexts.[9]

The more popular media discourses in play in discussions of the future of environmental factors in security policy are not nearly so sophisticated, but they are likely to get political attention when published as a cover story in a prestigious upmarket magazine like the *Atlantic*.[10] Kaplan was taken seriously in the White House, given his track record as a travel writer and war correspondent with a knack of getting into conflict areas. His 'Anarchy' article was specifically cited by President Clinton in a speech soon after its appearance, and 'became a practically *de rigueur* citation among Cabinet members appearing before Congress.'[11] While Kaplan's article did not initiate the policy process considering the links between security and environment, it undoubtedly raised their profile considerably.[12]

Malthus and Mackinder

In many ways none of this is very new. In England, in the years following Malthus' initial publication during the transformations of the Industrial Revolution, and in the aftermath of the American and French revolutions, there were widespread concerns among the political elites and in the emergent middle classes about political order, linked to the fear of the mob as a destabilizing social factor. As Michel Foucault has argued, it was in the period immediately prior to Malthus that the conception of 'population' as an object to be controlled, manipulated, and managed by states clearly emerged as an important factor in modern modes of governmentality.[13] In a partial reversal of Malthus' concerns, Halford Mackinder wrote a century later about the need for 'manpower' as a key component of imperial defence.

Fear of 'over'-population and social hardship has been a recurring political theme through the Cold War, albeit one that was less prominent than concerns with superpower rivalry. Harrison Brown's *The Challenge of Man's Future*, published in the early 1950s, was a discussion of then contemporary Malthusian themes.[14] A generation later Paul Ehrlich published *The Population Bomb* which generated considerable controversy with its dire predictions of future catastrophe.[15]

Following the much-publicized African famines of the 1980s, Paul Ehrlich returned to his earlier themes of population growth in a new book called *The Population Explosion*, where he argued that the 'bomb' he warned of earlier had now exploded, with huge numbers of people dying each year from hunger and hunger-related diseases.[16] *Beyond the Limits* was published as a sequel to the *Limits to Growth* in 1992, suggesting policy options to be taken to prevent 'overshoot' and collapse by working toward a sustainable society.[17] While estimates of how many people the planet can feed vary widely depending on assumptions about technology, diet, distribution of wealth, water resources, and calculations of the availability of arable land, the logic of this

type of thinking suggests that disaster will occur as 'natural' limits are reached.[18] Many of these themes have also appeared fairly regularly in large-circulation American magazines since the beginning of the Cold War.[19]

Given these themes, Kaplan is in some ways a continuation of long-established lines of argument. But he is new in that his powerful articulation of environment as the cause of threats to national security has updated Malthusian themes and brought the 'environmental security' policy discussions forcefully to the attention of a wider public. In doing so Kaplan revisits many of the geopolitical assumptions in security thinking, and does so in specifying the environment as a threat. This use of specific geopolitical assumptions to frame the demographic and related environmental dimensions in post-Cold War security thinking is a focus in what follows. In the case of neo-Malthusianism and the more general policy discourse of 'environmental security', the 'threat' is often at least partly from somehow external 'natural' or 'environmental' phenomena. More specifically, Kaplan's essay can be read as an analysis of, in Ó Tuathail and Luke's terms, the 'wild' zones of the new geopolitical (dis)order where the potential for disruptive incursions into the 'tame' zones of postmodern prosperity requires their containment, if necessary by military force.[20]

But as the analysis of Robert Kaplan's article makes particularly clear, the geopolitical formulations in American political discourse are not simply a continuation of Cold War themes. The new danger of environmental degradation is accentuated here, as are demographic concerns, while old concerns about access to resources are often downplayed or ignored. Africa in particular is now understood not as a security commodity, which is significant as a place of superpower rivalry and mineral supplies, but as a source of political instability that may, if unchecked by security measures, spread further afield to threaten areas of Northern affluence.

In an ironic reprise of earlier American cultural themes of a hostile nature that needed to be 'tamed', 'domesticated', and rendered benign by colonization of the 'frontier', 'the environment' has been specified as that which is foreign and threatening.[21] As writers have made clear, metaphors of wars with nature are not new; but this paper argues that the explicit linkage of military metaphors of nature as a hostile force with geopolitical threats to national security gives these themes a new and potentially ominous twist.[22]

Robert Kaplan's 'Coming Anarchy'

Kaplan's article pulls no punches in its pessimistic vision of environmentally induced social collapse, spreading disease and crime. With armed gangs of 'technicals', inspired by 'juju spirits', in West Africa and the widespread collapse of social order in Asia and Yugoslavia, the nation-state is, he argues, quickly becoming a political formation of the past, and sovereignty is now a dated fiction derived from the cartographic practices of another era.

The magazine's designers powerfully reinforce the message. The front cover illustration shows a crumpled map of the world starting to burn on a wood floor, the flames rising into words superimposed on the wall behind. In bold capitals they ominously announce.

> The coming anarchy: Nations break up under the tidal flow of refugees from environ-
> mental and social disaster. As borders crumble, another type of boundary is erected—a
> wall of disease. Wars are fought over scarce resources, especially water, and war itself be-
> comes continuous with crime, as armed bands of stateless marauders clash with the pri-
> vate security forces of the elites. A preview of the first decades of the twenty-first century.

The article is accompanied by stark photographs. The opening pages depict armed
soldiers walking past human skeletal remains in Liberia. Photographs of roadside
warnings of 'killing zones' in Sierra Leone, of mass graves in Bosnia, and of Kurdish
guerrillas in Turkey are followed by pictures of human corpses, the consequences of
violent retribution in Liberia and Vukovar. Pictures of 'the press of population', show-
ing buses amid crowds in Lagos and people doing their washing in an Abidjan lagoon
as well as other photographs of Southern cities, suggest overcrowding. The final pho-
tograph is of looters in the riots following the trial of police officers in the Rodney
King case in Los Angeles, suggesting that the scenes in the earlier depictions were
intimations of things to come in the United States. The theme of 'ethnic' conflict is
prominent.

Kaplan starts with West Africa, where he argues that crime is the order of the day
or, more specifically, the order of the night, when what tentative authority govern-
ments have dissipates as youthful criminals take to the streets. We are told that organ-
ized crime is related to the collapse of the nation-state and the rise of demographic
and environmental stresses. Drug cartels and private security forces take over where
social stress has led to the collapse of more conventional political order. To Kaplan
this is clearly the future of global politics, a spectre that confronts 'our' civilization
and one that conjures up '… Thomas Malthus, the philosopher of demographic
doomsday, who is now the prophet of West Africa's future. And West Africa's future,
eventually, will also be that of most of the rest of the world.'[23] Picking up on another
theme in the contemporary popular geopolitical imagination, the spread of deadly
diseases, Kaplan portrays them, and new forms of antidote-resistant malaria in par-
ticular, as an emerging impenetrable barrier closing the whole African continent off
from the rest of the world even as its internal state boundaries crumble.[24] The only
exceptions to this exclusion by the 'wall of disease' are likely to be coastal trading-posts.

This introduces the environmental theme framed in terms of extensive shanty
towns on the urbanizing coast of West Africa. 'In twenty-eight years Guinea's popula-
tion will double if growth goes on at current rates. Hardwood logging continues at
madcap speed, and people flee the Guinean countryside for Conakry. It seemed to me
there that here, as elsewhere in Africa and the Third World, man is challenging nature
far beyond its limits, and nature is now beginning to take its revenge.'[25] But quite what
the mechanism is that drives the migration is not explained; the text merely suggests
that it is related to deforestation. Africa may, he suggests, be like the Balkans 100 years
ago, a harbinger of an old (imperial) order collapsing and giving way to nations based
on tribe. But a century later the analogy contains a fundamental difference: 'Now the
threat is more elemental: *nature unchecked.*'[26]

Environmental scarcity is the first of the concepts that one must look at to under-
stand Kaplan's new world. It is linked to cultural and racial clashes, geographical

'destiny', and the transformation of warfare. Looking in turn at these themes allows Kaplan to sketch out the map of the new political situation. Of prime importance to all these matters is the environment. In the pivotal passage in his article, reproduced above at the beginning of this paper, he draws on the themes from the more pessimistic 'environmental security' literature, to argue that the environment is the national-security issue of the near future.[27] This is no small claim. It suggests that the fate of modern states is now tied directly to the fate of environments around the world. Ecological disruptions are now to be feared—the environment understood as 'a hostile power'.

The specific intellectual inspiration claimed for this re-imagining of American security policy is Thomas Homer-Dixon, whose 1991 *International Security* article, 'On the Threshold: Environmental Changes as Causes of Acute Conflict', is admiringly cited.[28] The thrust of Homer-Dixon's article suggests to Kaplan that growing scarcity of resources in many places coupled with increasing population numbers may lead to social pressures, increased migration, environmental refugees, and inter-group conflict in many places. According to Kaplan, Homer-Dixon's research can be interpreted to suggest that the environmental degradation in the developing world 'will present people with a choice that is increasingly among totalitarianism (as in Iraq), fascist-tending mini-states (as in Serb-held Bosnia), and road warrior cultures (as in Somalia)'.[29] The implication is that all these developments threaten political stability and hence, at least indirectly, the security of Northern states. Environmental degradation may well lead to war.[30]

The clashes between groups that are likely to result from identity conflicts induced by environmental degradation are, Kaplan argues, probably going to occur along lines of tribal and cultural fracture. In making this case he uses Samuel Huntingdon's much-cited *Foreign Affairs* article 'The Clash of Civilizations', which suggested that long-term cultural divisions were likely to determine the pattern of post–Cold War geopolitics. Kaplan argues that because Huntingdon's argument is painted with such a broad brush some of the details are inaccurate.[31] The clashes in the Caucasus are a matter of cultural identity and Turkish versus Iranian civilizations, rather than a clear battle between the forces of Christianity and Islam, as Huntingdon's thesis suggests. Kaplan points to the continued struggles between the Turkish state and the Kurdish population in Eastern Turkey as a contest of great importance for the future of the Middle East, not least because of the presence in this region of major Turkish hydroelectric projects that control crucial water flows into Syria and Iraq.

These specifications of identity in terms of cultures link the text to another theme of classical geopolitics, the focus on 'organic communities' as the preferred political communities. As Ó Tuathail notes, Mackinder's political thinking, often remembered in the terms of the quotation introducing this paper as relating to matters of 'geopolitics' (a term Mackinder didn't like), is perhaps better understood in terms of conservative nostalgias for stable cultural identities which support political stability.[32] The organic assumption of stable cultural identities plays into support for clan, tribe and nation, and becomes particularly powerful when coupled to claims to territory and sovereignty. As in Huntingdon's analysis, 'eternal' social essences and identities are invoked in the face of dramatic social and political change. For Kaplan only

Huntingdon's *scale* is wrong: politics is about geopolitical identities that suggest permanent fissures between potentially warring parties.

Kaplan ends his article by arguing that coherent national states are a fading political phenomenon that conventional political cartographies no longer accurately represent, and by speculating on the future of India and Pakistan as their burgeoning populations, with long histories of collective violence, face the future on a dwindling resource base. Add to this speculations about global climate change and the future of political order in states like Egypt, and the potential for drastic political upheaval seems huge. Even the United States may not survive, given its ethnic tensions and individualist culture. These tensions might well be aggravated by African disasters, as Afro-Americans demand American actions to provide help to stricken populations. The final few paragraphs comment on the author's return to the United States after his research trip for this article and the sight of laptop computer-equipped business people at Kennedy Airport on their way to Tokyo and Seoul. No such people were boarding planes to Africa. The suggestion is once again of two worlds with little connection.

Some months after the article's publication, political violence tore Rwanda apart and media reports of 'tribal' slaughter apparently confirmed Kaplan's nightmarish vision.[33] The stark prose and violent images in Kaplan's article capture the alarmist themes of contemporary neo-Malthusianism. While other articles in policy journals and books by authors as prominent as Paul Kennedy discuss these demographic and environmental themes, Kaplan's article is significant in the bluntness with which he gives these themes widespread popular exposure. As such, his text is the most high-profile exemplar of the alarmist streams in the larger policy discourse of 'environmental security'.

Robert Kaplan's Geopolitical Imagination

However, the world is not quite so conveniently simple as Kaplan's popularization of environmental degradation as the key national security issue for the future suggests. His article, for all its dramatic prose and empirical observation, is vulnerable to numerous critiques. If one reads it as a cultural production of considerable political importance it is fairly easy to see how the logic of the analysis, premised on 'eye-witness' empirical observation, and drawing on an eclectic mixture of intellectual sources, leaves so much of significance unsaid. But the impression, as has traditionally been the case in geopolitical writing, generated from the juxtaposition of expert sources and empirical observation is that this is an 'objective', detached geopolitical treatise. Detailed critique of the epistemologies of both traditional and contemporary geopolitics has been developed elsewhere.[34] The focus in what follows is on the political implications of the widely shared geopolitical assumptions that structure this text and ultimately render the environment as a threat.

The most important geopolitical premise in the argument posits a 'bifurcated world', one in which the rich in the prosperous 'post-historical' cities and suburbs have mastered nature through the use of technology, while the rest of the population

is stuck in poverty and ethnic strife in the shanty towns of the under-developed world.[35] The presentation of the article in the magazine supports this basic formulation of the world into the rich, who read magazines like *Atlantic*, and the rest, who don't.

Insofar as politics is defined in terms of the articulation of discourses of danger, Kaplan's analysis can be read in terms of a persistent textual dualism between post-modern consumer aspirations and fear of 'reprimitivized' violence and environmental degradation.[36] The presentation of a bifurcated world is powerfully reinforced by the dramatic contrasts between the advertisements and the images and content of the text. All the advertisements suggest the symbols of consumer affluence: three are for automobiles, one for gin, two for stereophonic audio equipment, one for a book club, and another for compact discs. Nothing unusual here. But on closer inspection these advertisements speak volumes about the geopolitics of the contemporary world. Where the article uses the metaphor of stretched limousines for the affluent, driving over potholed streets in New York, the automobile advertisements show the luxury interior of one vehicle, another parked beside a traditional brick house in a state of apparently rural bucolic bliss. The Saab advertisement, stretching over three pages, emphasizes the achievements of high-technology engineering.

But the juxtaposition of the two worlds of aspiration and fear can be taken further. Where the article talks of non-Western cultures in conflict, and of slums that are de-scribed as so appalling that not even Charles Dickens would give them credence, the book of the month club advertisement is for a twenty-one-volume collection of Dick-ens' works. The advertisement for a Bose radio is focused on a Stradivarius violin. The advertisement for a Sony CD player shows a grand piano and a Sony scholarship-winning Juilliard School pupil, cultural artifacts far removed from juju spirits, animism, or even Islam. The appreciative student pianist endorsing Sony contrasts dramatically with the mention in the text of the article of Solomon Anthony Joseph Musa, a coup leader in Sierra Leone who, it is claimed, 'shot the people who had paid for his schooling, "in order to erase the humiliation and mitigate the power his middle class sponsors held over him"'.[37] The final advertisement, for Columbia House compact discs focuses, in a truly bizarre irony, on the history of the blues!

Perhaps most geopolitically revealing, however is the advertisement for 'Bombay Sapphire Distilled London Dry Gin'. The juxtaposition of Bombay and London, along with the image of Queen Victoria on the label on the bottle, suggests the legacy of colonialism and the commercial advantages gained by European powers in earlier geopolitical arrangements. In all of Kaplan's article such matters of international trade are barely mentioned. The wall of disease may bar many foreigners from all ex-cept some coastal trading posts of Africa in the future, but the significance of what is being traded and with what implications for the local environment is not investigated. 'Hot cash', presumably laundered drug money from African states, apparently does flow to Europe, we are told, but this has significance only because of the criminal dimension of the activity, not as part of a larger pattern of political economy. While the lack of business people flying to Africa is noted, comments about the high rate of logging are never connected to the export markets for such goods, or to the economic circumstances of indebted African states that distort local economies to pay inter-national loans and meet the requirements for structural adjustment programmes.[38]

Logging continues apace, but it is apparently driven only by some indigenous local desire to strip the environment of trees, not by any exogenous cause. A focus on the larger political economy driving forest destruction would lead the analysis in a very different direction, but it is a direction that is not taken by the focus on West Africa as a quasi-autonomous geopolitical entity driven by internal developments.

The political violence and environmental degradation are not related to larger economic processes anywhere in this text. These sections of Kaplan's text show a very limited geopolitical imagination, one that focuses solely on local phenomena in a determinist fashion that ignores the larger trans-boundary flows and the related social and economic causes of resource depletion. Kaplan ignores the legacy of the international food economy, which has long played a large role in shaping the agricultural infrastructures, and the nutritional levels, of many populations of different parts of the world in specific ways.[39] He also ignores the impact of the economic crisis of the 1980s and the often deleterious impact of the debt crisis and structural adjustment policies. He completely misses their important impact on social patterns and on rural women, who suffered many of the worst effects.[40]

Ironically, while Kaplan emphasizes the inadequacies of maps for understanding ethnic and cultural clashes, he never investigates their similar inadequacies for understanding economic interconnections as an important part of either the international relations or the foreign policies of these states.[41] This crucial omission allows for the attribution of the 'failure' of societies to purely internal factors. Once again, the local environment can be constructed as the cause of disaster without any reference to the historical patterns of development that may be partly responsible for the social processes of degradation.[42]

Given the focus of most Malthusians on the shortage of 'subsistence' and resources in general, there is remarkably little investigation of how the burgeoning populations of various parts of the world are actually provided for, in terms either of food production or of other daily necessities. Despite accounts of trips across Africa by 'bush-taxi', agricultural production remains invisible to Kaplan's 'eye-witness'. While cities are dismissed as 'dysfunctional', the very fact that they continue to grow despite all their difficulties suggests that they do 'function' in many ways. Informal arrangements and various patterns of 'civil society' are ignored. People move to the cities, but quite why is never discussed in this article; imprecise references to degraded environments and the world soil degradation map on Thomas Homer-Dixon's office wall are all that is offered.[43] There is no analysis here of traditional patterns of subsistence production and how they and access to land may be changing in the rural areas, particularly under the continuing influence of modernization.[44] While it is made clear that traditional rural social patterns fray when people move to the very different circumstances of the city, the reasons for migration are assumed but never investigated. In Homer-Dixon's language, absolute scarcity is assumed and the possibilities of relative scarcity, with the negative consequences for poor populations due to unequal distribution or the marginalization of subsistence farmers as a result of expanded commercial farming, is never investigated.[45] Here, resurgent cultural fears of 'the Other' and assumptions about the persistence of cultural patterns of animosity and social cleavage are substituted for analysis of resources and rural political ecology. Precisely where the

crucial connections between environmental change, migration, and conflict should be investigated the analysis turns away to look at ethnic rivalries and the collapse of social order. The connections are asserted, not demonstrated, and in so far as this is done the opportunity for detailed analysis is missed and the powerful rhetoric of the argument retraces familiar political territory instead of looking in detail at the environment as a factor in social change. In this failure to document the crucial causal connections in his case, Kaplan ironically follows Malthus, who relied on his unproven key assumption that subsistence increases only at an arithmetical rate in contrast to geometric population growth.

Political angst about the collapse of order is substituted for an investigation of the specific reasons for rapid urbanization, a process that is by default rendered as a 'natural' product of demographic pressures. This unstated 'naturalization' then operates to support the Malthusian fear of poverty-stricken mobs—or, in Kaplan's terms, young homeless and rootless men forming criminal gangs—as a threat to political order. Economics becomes nature, nature in the form of political chaos becomes a threat: the provision of security from such threats thus becomes a policy priority. In this way 'nature unchecked' can thus be read directly as a security threat to the political order of postmodernity.

Geopolitics, Malthus, and Kaplan

Kaplan explicitly links the Malthusian theme in his discussion of Africa to matters of national security, where a clear 'external' threatening dimension of crime and terrorism is linked to the policy practices of security and strategic thinking. The logic of a simple Malthusian formulation is complicated by the geographical assumptions built into Kaplan's argument, while he has simultaneously avoided any explicit attempt to deal with the political economy of rural subsistence or contemporary population growth. Thus, in his formulation, the debate is shifted from matters of humanitarian concern, starvation, famine relief, and aid projects and refocused as matters of military threat and concern for political order within Northern states.

What ultimately seems to matter in this new designation is whether political disorder and crime will spill over into the affluent North. The affluent world of the *Atlantic* advertisements with their high-technology consumer items is implicitly threatened by the spreading of 'anarchy'. The article implies that it has done so already insofar as American inner cities are plagued with violent crime. The reformulation once again posits a specific geopolitical framework for security thinking. Kaplan himself suggests that by his own logic the US may become more fragmented and Canada may dissolve following the secession of Quebec, shorn of its Northern resource hinterland. He even argues that Quebec, supposedly a culturally homogeneous society, may end up being the most stable region of North America. What cannot be found in this article is any suggestion that the affluence of those in the limousine might in some way be part of the same political economy that produces the conditions of those outside.

Although Kaplan is particularly short on policy prescription in his *Atlantic* article, some of the implications of his reworked Malthusianism do have clear policy

implications. Instead of repression and the use of political methods to maintain inequalities in the face of demands for reform, Kaplan's implicit geopolitics suggest abandoning Africa to its fate. If more Northern states withdraw diplomatic and aid connections and, as he notes, stop direct flights to airports such as Lagos, the potential to isolate this troubled region may be considerable. Once again, security is understood in the geopolitical sense of containment and exclusion.

In a subsequent article in the *Washington Post*, Kaplan explicitly argues against US military interventions in Africa.[46] He suggests that intervention in Bosnia would do some good, because the developed nature of the societies in conflict there allows some optimism that a political settlement is workable. The chances of intervention having much effect in Africa are dismissed because of the illiterate, poverty-stricken populations there. However, the pessimism of the *Atlantic* article is muted here by a contradictory suggestion that all available foreign-policy money for Africa be devoted to population control, resource management, and women's literacy. These programmes will, Kaplan hopes, in the very long term resolve some of the worst problems, allowing development to occur and 'democracy' eventually to emerge. The ethnocentrism of the suggestion that Africa's problems are soluble in terms of modernization is coupled with the implication that West Africa is of no great importance to the larger global scheme of power and economy, and therefore can be ignored, at least as long as the cultural affinities between Africans and African-Americans do not cause political spill-overs into the United States. Precisely this marginalization is of concern to many African leaders and academics. But in stark contrast to Kaplan, many Africans emphasize the need to stop the export of wealth from the continent, and the need to draw on indigenous traditions to rebuild shattered societies and economies.[47]

There is an ironic twist in Kaplan's geopolitical specifications of 'wild zones'. He argues that they are threats to political stability and, in the case of Africa, probably worth cutting loose from conventional political involvement. In the subsequent *Washington Post* article he argues against military interventions in Africa on the basis of their uselessness in the political situation of gangs, crime, and the absence of centralized political authority. His suggestions imply that interventions are only considered in terms of political attempts to resolve conflicts and provide humanitarian aid. In this assumption Kaplan is at odds with Cold War geopolitical thinking. While ignoring the political economy of under-development as a factor in the African situation, he also ignores the traditional justifications for US political and military involvement in Africa and much of the Third World. Through the Cold War these focused on questions of ensuring Western access to strategic minerals in the continent. This theme continues to appear in many other discussions of post–Cold War foreign policy and in US strategic planning.[48] But Kaplan ignores both these economic interconnections and their strategic implications, preferring an oversimplified geopolitical specification of Malthusian-induced social collapse as the sole focus of concern.

But the specification of danger as an external 'natural' phenomenon works in an analogous way to the traditional political use of Neo-Malthusian logic. Once again threats are outside human regulation, inevitable and natural in some senses—if not anarchic in the neo-realist sense of state system structure, then natural in a more fundamental sense of 'nature unchecked'. By the specific spatial assumptions built

into his reasoning, Kaplan accomplishes geopolitically what Malthusian thinking did earlier in economic terms. Coupled with prevalent American political concerns with security as 'internal' vulnerability to violent crime, and 'external' fears of various foreign military, terrorist, economic, racial, and immigration 'threats', Kaplan rearticulates his modified Malthusianism in the powerful discursive currency of geopolitics. His themes fit neatly with media coverage of Rwanda and Somalia, where his diagnosis of the future appeared in many media accounts to be occurring nearly immediately.[49]

Understood as problems of 'tribal' warfare, such formulations reproduce the earlier tropes of 'primitive savagery'. As other commentators on contemporary conflict have noted, detailed historical analysis suggests that the formation of 'tribes', and many of the 'tribal wars' that European colonists deplored, were often caused by the sociological disruptions triggered by earlier European intrusions. Denial or failure to understand the causal interconnections of this process allowed for the attribution of 'savagery' to 'Others' inaccurately specified as geographically separate.[50] Kaplan notes that the disintegration of order is not a matter of a 'primitive' situation but, following van Creveld, a matter of 'reprimitivized' circumstances in which high-technology tools are used for gang and 'tribal' rivalries. But the economic connections that allow such 'tools' to become available are not mentioned. Thus reprimitivization is specified as the indirect result of environmental degradation, a process that is asserted frequently but not argued, demonstrated, or investigated in any detail.

The Rest against the West

One important theme in contemporary discussions of Northern 'security' is mentioned only in passing in Kaplan's analysis. This is the theme of massive long-distance migration and the likely social consequences.[51] In contrast, Matthew Connelly and Paul Kennedy's later article in the *Atlantic Monthly* looked specifically at migrations of impoverished humanity in motion as the global order changes at the end of the Cold War.[52] The environmental theme is of less salience in their article, which focuses more explicitly on strictly demographic matters. In the context of current fears about illegal migration in both Europe and the United States, they look to Malthusian speculations about global demography and return to Kishore Mahbubani's phrase to raise the question of whether 'demographic politics' has to be played out in a geopolitical conflict between 'the rest' and 'the West'.[53] In particular, they focus on 'the key global political problem of the final years of the twentieth century: unbalanced wealth and resources, unbalanced demographic trends, and the relationship between the two'.[54] In contrast to Kaplan, who is concerned with the spill-over from the wild zones to the tame ones but who never looks seriously at international migration as a mechanism for this 'danger', Connelly and Kennedy examine this geopolitical factor directly.

Where Kaplan relies on his 'eye-witness' journalistic accounts to set up his larger discussion, Connelly and Kennedy start with Jean Raspail's controversial early 1970s French novel *The Camp of the Saints*, focusing on its dramatic story of impoverished Indians hijacking ships and setting forth across the oceans for France. Again, the designers of the *Atlantic Monthly* use a dramatic cover illustration, framed again in

spatial terms of the tension between fear and aspiration, to emphasize the theme of the article. It shows a pale-skinned suburban householder equipped with a spatula and wearing an apron emblazoned with the motif 'home sweet home'. Accompanied by his dog, he is standing on a patio beside a barbecue which is cooking wieners. The suburban ideal is marred only by the many dark-skinned faces, some clad in various 'ethnic' headgear, who are looking over the white picket fence surrounding his yard. The text superimposed on the fence summarizes the theme of the article: 'Whether it's racist fantasy or realistic concern, it's a question that won't go away: As population and misery increase, will the wretched of the earth overwhelm the Western paradise?' The article argues that Raspail is in many places guilty of a variety of racist sentiments but that the themes in this disturbing novel are germane to current discussions of foreign policy and the focus in the US on immigration. In particular, the relative decline of the European races in terms of total numbers of population suggests the inevitable triumph of the former colonized peoples who will in the next few decades, as European populations atrophy, reverse the geopolitical patterns of North and South.

While the neo-Malthusian framework is in the presentation of the argument in terms of massive dislocations and migrations from the poor to the rich world, this article's conclusions are notably different from Kaplan's geopolitical pessimism. It notes the arguments by the technological optimists, in response to Kaplan's despair, that global economic indicators show widespread signs of optimism, but suggests that this optimism is not in any practical way linked to the fate of the poorest billions of the world's population.[55] Connelly and Kennedy also point out that, while production has been globalized, the mobility of labour has not. Geographical restrictions on the mobility of workers are in dramatic contrast to the ability of transnational corporations to switch production and investments around the globe.[56] Even if the 'techno-liberal' optimists are correct and growth does occur, it seems likely that, given population growth, the absolute, if not relative, numbers of very poor will increase.

Drawing on the elaborated speculations in Kennedy's earlier book, *Preparing for the Twenty-First Century*, the article offers much greater recognition of the interconnectedness of global problems, and proffers suggestions for policy initiatives that tackle poverty and related economic and environmental issues.[57] The scenario of desperate, impoverished people attempting to move to the affluent world, and the unpleasant policy implications of trying to resist such migrations by force, are merely hinted at. But unlike Kaplan, with his unexamined assumptions of environmental degradation, the geopolitical version of the Malthusian scenario is not judged to be inevitable. Instead, they argue the case for a new North–South political deal in which global cooperation is seen as necessary by political leaders. They admit that transcending partisan and national perceptions of political possibilities and difficulties may not be easy, but argue that it is clearly necessary to deal with 'global' problems.

Beyond Malthus and Mackinder?

Nonetheless, the continued possibilities of using Malthusian themes as ideological weapons by the powerful in justifying repression, or at the least justifying inaction in

the face of gross inequities, now has to be complemented by a recognition that these themes can be mobilized in foreign-policy discourse to suggest the appropriateness of military solutions to demographic and 'environmental' problems. At least in the earlier version of his famous essay, Malthus argued that population growth is inevitable, natural, and largely beyond human regulation.[58] Politics is thus rendered as just a reaction to the consequences of the unchangeable patterns of fecundity. Further, he argued, it occurs in such a manner that helping the poor is counterproductive. In Abernethy's rejoinder to Connelly and Kennedy, she argues that development assistance to poor states often actually renders their populations more fertile by raising hopes which development projects ultimately fail to deliver, hence aggravating the problem of population numbers.[59] If the political consequences of population growth are disruptive to the Northern geopolitical order that is judged to be the only acceptable one, then neo-Malthusianism acts as a powerful intellectual weapon in formulating policies to repress and politically control reformist demands for greater equality or economic redistribution. It can do so on the grounds that such policies only aggravate adverse demographic trends. When coupled with Kaplan's assertions that population growth is related to environmental degradation, the argument is strengthened.

If the more alarmist versions of some of Kaplan's arguments gain credence in Washington, or if the formulation of politics in terms of the rest and the West becomes prominent, then the dangers of a new Cold War against the poor are considerable. The discussions of illegal immigration in the US in the early 1990s, and suggestions that the solution is increased border guards, denial of services to immigrants incapable of proving legal residence, and deportations, suggest that the geopolitical imagination of spatial exclusion is dominating the policy discourse once again. In particular this may be because of the propensity among American politicians to formulate American identity in antithesis to external perceived dangers. Through the history of the last two centuries this has been a powerful theme in the formulation of American foreign policy which has drawn on the related discourses of American exceptionalism.[60]

This geopolitical imagination has been frequently coupled with assertions of cultural superiority and ideological rectitude in the form of various articulations of moral certainty. The dangers of ethnocentrism, when coupled with geopolitical reasoning, are greatest precisely where they assert strategic certainty in ways that prevent analysis of the complex social, political, and economic interactions that might lead to assessments that in at least some ways 'the problem is us'.[61]

All this suggests the need for continued challenges to the use of traditional geopolitical reasoning in the formulation of foreign policy and in the study of the discourses of contemporary international politics. Geographical complexity, and in particular detailed local environmental investigations and trans-boundary economic interconnections, may not provide grisly images and spectacular headlines; but it seems a reasonable bet that such geographs offer better possibilities for the demilitarization of international politics, the amelioration of environmental problems, and the resolution of at least some of the difficulties induced by economic change and migration.

NOTES

1. Thomas Malthus, *An essay on the principle of population* (Harmondsworth, Penguin, 1970: original edn 1798), p. 71.

2. Halford J. Mackinder, 'The geographical pivot of history', *Geographical Journal* **23**(4) (1904), repr. in R. Kasperson and J. Minghi, eds., *The structure of political geography* (Chicago, Aldine, 1969), p. 161.

3. Robert D. Kaplan, 'The coming anarchy', *Atlantic Monthly* **273**(2) (1994), p. 58.

4. It has apparently received a wide readership. The article was reproduced in the *San Francisco Chronicle* on Sunday 13 Mar. 1994, and has been commented on by media columnists including Anthony Lewis in the *New York Times* ('A bleak vision', 7 Mar. 1994, p. A17). It has been cited, in a diverse range of languages, in articles concerned in one way or another with visions of the future, in academic and policy journals ranging from sociological theory in the Czech *Sociologicky Casopis* to design philosophy in *Ergonomics.*

5. G. Meyers, T. Klak, and T. Koehl, 'The inscription of difference: news coverage of the conflicts in Rwanda and Bosnia', *Political Geography* **15** (1) (1996), pp. 21–46.

6. I. Bellany, 'Malthus and the modern world', *Review of International Studies* **20**(4) (1994), pp. 411–22.

7. On the importance of geopolitical discourse and its assumptions in foreign policy formulation at the largest scales, see J. Agnew and S. Corbridge, *Mastering space: hegemony, territory and international political economy* (London, Routledge, 1995).

8. S. Dalby, 'The threat from the south:', in D. Deudney and R. Matthews, eds, *Contested grounds: security and conflict in the new environmental politics* (Albany, State University of New York Press, 1996); Vandana Shiva, 'Conflicts of global ecology: environmental activism in a period of global reach', *Alternatives* **19**(2) (1994), pp. 195–207.

9. J. Kakonen, ed. *Green security or militarized environment* (Aldershot, Dartmouth, 1994); G. Prins, ed., *Threats without enemies: facing environmental insecurity* (London, Earthscan, 1993).

10. Although now long past its period of greatest influence in American political and cultural life a century ago, the *Atlantic*, with a circulation of 450,000, continues to be an important vehicle for discussion of cultural and political topics in the United States. On the early history, see E. Sedgewick, *The Atlantic Monthly, 1857–1909* (Amherst, University of Massachusetts Press, 1994).

11. M. A. Levy, 'Is the environment a national security issue?', *International Security* **20**(2) (1995), p. 35; President Clinton's remarks to the National Academy of Sciences, 29 June 1994, are summarized in the Woodrow Wilson Centre *Environmental change and security project report* **1** (1995), p. 51.

12. Geoffrey D. Dabelko, 'Environmental security: the parameters of the U.S. debate', paper presented to a conference on 'New frontiers in international security', Rosslyn, VA, Oct. 1995.

13. M. Foucault, 'Governmentality', in G. Burchell, C. Gordon, and P. Miller, eds, *The Foucault effect* (Chicago, Chicago University Press, 1991), pp. 87–104.

14. H. Brown, *The challenge of man's future* (New York, Viking, 1954). There is an interesting precursor to Kaplan's use of Fukuyama in the bibliographical essay at the end of Brown's book. He also cites a title with the term 'post-historic' in it: R. Seidenberg, *Post-historic man* (Durham, University of North Carolina Press, 1950).

15. P. R. Ehrlich, *The population bomb* (New York, Ballantine, 1968).

16. P. R. Ehrlich and A. H. Ehrlich, *The population explosion* (New York, Simon & Schuster, 1990).

17. D. H. Meadows, D. L. Meadows, and J. Randers, *Beyond the limits* (London, Earthscan, 1992).

18. V. Smil, 'How many people can the earth feed?', *Population and Development Review* **20**(2), (1994), pp. 255–92.

19. J. R. Wilmoth and P. Ball, 'The population debate in American popular magazines', *Population and Development Review* **18**(4) (1992), pp. 631–68.

20. G. Ó Tuathail and T. W. Luke, 'Present at the (dis)integration: deterritorialization and reterritorialization in the new wor(l)d order', *Annals of the Association of American Geographers* **84** (3) (1994), pp. 381–98. They note that 'wild' and 'tame' zones can be read from Samuel Huntingdon's widely cited 'The clash of civilizations', *Foreign Affairs* **72**(3) (1993), pp. 22–49, and is a particularly salient theme in M. Singer and A. Wildavsky, *The real world order: zones of peace, zones of turmoil* (Chatham, NJ, Chatham House, 1993).

21. There is a vast literature, not only in the pages of this journal, on the themes of the domination of nature and its philosophical roots; see e.g. William Leiss, *The domination of nature* (Boston, Beacon, 1974) and Carolyn Merchant, *The death of nature: women, ecology and the scientific revolution* (San Francisco, Harper & Row, 1980), as well as such themes as pastoral ideals in American thought in books like Leo Marx, *The machine in the garden* (New York, Oxford University Press, 1964). This article, however, traces the logic of Kaplan's writing in terms of the appropriation of the environment as a security threat in post-Cold War political thinking. Undoubtedly Kaplan's analysis in part finds its resonance with its audience because of the cultural ambiguities in the multiple constructions of 'nature' and 'wilderness', but such a reading is not the focus of this analysis.

22. e.g. John McCannon, 'To storm the Arctic: Soviet polar exploration and public visions of nature in the USSR, 1932–1939', *Ecumene* **2**(1) (1995), pp. 15–31.

23. Kaplan, 'The coming anarchy', p. 48.

24. See L. Garrett, *The coming plague: newly emerging diseases in a world out of balance* (New York, Farrar Strauss, 1994); R. Preston, *The hot zone* (New York, Random House, 1994), which inspired the movie *Outbreak*, and episodes of *The X-Files* television drama through 1994 and 1995.

25. Kaplan, 'The coming anarchy', p. 54.

26. *Ibid.*

27. See in general N. Myers, *Ultimate security: the environmental basis of political stability* (New York, Norton, 1993); D. Pirages, 'Demographic change and ecological security', in M. T. Klare and D. C. Thomas, eds, *World security: challenges for a new century* (New York, St Martin's Press, 1994), pp. 314–31.

28. T. Homer-Dixon, 'On the threshold: environmental changes as causes of acute conflict', *International Security* **16**(1) (1991), pp. 76–116.

29. Kaplan, 'The coming anarchy', p. 59.

30. Kaplan's article went to press before the appearance of Homer-Dixon's later *International Security* article that modified his earlier hypotheses. See T. Homer-Dixon, 'Environmental scarcities and violent conflict: evidence from cases', *International Security* **19**(1) (1994), pp. 5–40; but after the popular version of these findings was published, see T. Homer-Dixon, J. H. Boutwell, and G. W. Rathjens, 'Environmental change and violent conflict', *Scientific American* **268**(2) (1993), pp. 38–45. See also T. Homer-Dixon, 'Environmental and demographic threats to Canadian security', *Canadian Foreign Policy* **2**(2) (1994), pp. 7–40. These later articles suggest that as Homer-Dixon's research progressed, the earlier tentative hypotheses on which Kaplan builds his alarmist Malthusian interpretation were further qualified. Kaplan's summary is much more obviously Malthusian than Homer-Dixon's published research.

31. Huntingdon, 'The clash of civilizations'.

32. G. Ó Tuathail, 'Putting Mackinder in his place: material transformations and myth', *Political Geography* **11**(1) (1992), pp. 100–18.

33. R. D. Kaplan, 'Into the bloody new world', *Washington Post*, 17 Apr. 1994, pp. C1–2.

34. S. Dalby, 'Critical geopolitics: difference, discourse and dissent', *Environment and Planning D: Society and Space* **9**(3) (1991), pp. 261–83; G. Ó Tuathail, *Critical geopolitics* (Minneapolis, University of Minnesota Press, 1996).

35. Kaplan, 'The coming anarchy', p. 59. Kaplan cites Francis Fukuyama in relation to the designation 'post-historical'.

36. On 'discourses of danger', see M. Dillon, 'The alliance of security and subjectivity', *Current Research in Peace and Violence* **13**(3) (1991), pp. 101–24; and David Campbell and Michael Dillon, eds, *The political subject of violence* (Manchester, Manchester University Press, 1993).

37. Kaplan, 'The coming anarchy', p. 45. Thanks to Deepika Grover for pointing this out.

38. F. Cheru, 'Structural adjustment, primary resource trade and sustainable development in sub saharan Africa', *World Development* **20**(4) (1992), pp. 497–512.

39. J. Warnock, *The politics of hunger: the global food system* (London, Methuen, 1987).

40. F. Mackenzie, 'Exploring the connections: structural adjustment, gender and the environment', *Geoforum* **24**(1) (1993), pp. 71–87.

41. On the complicated interconnections of these themes in West Africa, see T. Shaw and J. E. Okolo, eds, *The political economy of foreign policy in ECOWAS* (New York, St Martin's Press, 1994).

42. This 'amnesia' is a recurring feature in many development discourses; see David Slater, 'The geopolitical imagination and the enframing of development theory', *Transactions of the Institute of British Geographers n. s.* **18** (1993), pp. 419–37, and Jonathan Crush, ed., *Power of development* (London, Routledge, 1995).

43. Vaclav Smil has noted that these maps offer information at such a level of generalization as to be effectively useless for detailed calculations of agricultural productivity. See V. Smil, 'Some contrarian notes on environmental threats to national security', *Canadian Foreign Policy* **2**(2) (1994), pp. 85–7.

44. R. L. Paarlberg, 'The politics of agricultural resource abuse', *Environment* **36**(8) (1994), pp. 7–9, 33–42. Some of the relations of modernization and rural conflict in Africa are explored in O. Bennet, ed., *Greenwar: environment and conflict* (London, Panos, 1991).

45. See D. J. Hogan, 'The impact of population growth on the physical environment', *European Journal of Population* **8** (1992), 109–23.

46. R. D. Kaplan, 'Into the bloody new world: a moral pragmatism for America in an age of mini-holocausts', *Washington Post*, 17 Apr. 1994, pp. C1–2.

47. See e.g. A. Adadeji, ed., *Africa within the world: beyond dispossession and dependance* (London, Zed, 1993); D. R. F. Taylor and F. Mackenzie, eds., *Development from within: survival in rural Africa* (London, Routledge, 1992); and more generally S. Amin, *Maldevelopment: anatomy of a global failure* (London, Zed, 1990).

48. See e.g. E. Anderson, 'The geopolitics of military material supply', *Geojournal* **31**(2) (1993), pp. 207–13; K. Butts, *The Department of Defense role in African policy* (Carlisle, PA, US Army War College Strategic Studies Institute, 1993); D. Volman, 'Africa and the new world order', *Journal of Modern African Studies* **31**(1) (1993), pp. 1–30. This discussion continues despite arguments that resource access issues are of declining importance because of technological innovation and global markets: see R. D. Lipschutz, *When nations clash: raw materials, ideology and foreign policy* (Cambridge, MA, Ballinger, 1989).

49. See N. Gibbs, 'Why? the killing fields of Rwanda', *Time*, 16 May 1994, pp. 21–7. In a reflection of Kaplan's themes, the caption under the heading of this feature article reads: 'Hundreds of thousands have died or fled in a month of tribal strife. Are these the wars of the future?'

50. N. L. Whitehead and R. B. Ferguson, 'Deceptive stereotypes about "tribal warfare"', *Chronicle of Higher Education*, 10 Nov. 1993, p. A48.

51. See O. Waever, B. Buzan, M. Kelstrup, and P. Lemaitre, *Identity migration and the new security agenda in Europe* (London, Pinter, 1993).

52. M. Connelly and P. Kennedy, 'Must it be the West against the rest?' *Atlantic Monthly* **274**(6) (1994), pp. 61–83.

53. K. Mahbubani, 'The West and the rest', *National Interest* (1992), pp. 3–13.

54. Connelly and Kennedy, 'Must it be …', p. 62.

55. On 'optimistic' rejoinders to the Kaplan thesis, see A. E. Server, 'The end of the world is nigh—or is it?', *Fortune*, 2 May 1994, pp. 123–4; M. Gee, 'Surprise! the world gets better!', *World Press Review* **14**(7) (July 1994), pp. 18–20.

56. See R. Barnet and J. Cavanagh, *Global dreams: imperial corporations and the new world order* (New York, Simon & Schuster, 1994).

57. P. Kennedy, *Preparing for the twenty-first century* (New York, HarperCollins, 1993).

58. As Vaclav Smil notes, the later, less frequently cited, versions included some guarded optimism about the possibilities of reconciling the growth of population with 'subsistence'. See Smil, 'How many'.

59. V. Abernethy, 'Optimism and overpopulation' *Atlantic Monthly* **274**(6) (1994), pp. 84–91; and in general V. Abernethy, *Population politics: the choices that shape our future* (New York, Plenum Press, 1993). Although her argument can be criticized because it presumes social stability, and patterns of reproductive behaviours that may not be appropriate assumptions for the poorest areas of the world, it does offer an alternative justification for modest grassroots aid projects aimed at the poorest sections of society. On how impoverishment of environmental resources can lead to increases rather than decreases in family size, see P. S. Dasgupta, 'Population, poverty and the local environment', *Scientific American* **272**(2) (1995), pp. 40–5.

60. D. Campbell, *Writing security: American foreign policy and the politics of identity* (Minneapolis, University of Minnesota Press, 1992).

61. T. Hentsch, *Imagining the Middle East*, trans. F. A. Reed (Montreal, Black Rose, 1992).

Large-Scale Economic Development

This section considers the effects of large-scale and long-term environmental change. Leslie White begins the section with a theory about the evolution of human energy use and, by implication, human effects on the environment. While White's evolutionary approach is largely out of step with current anthropology, his ideas of social progress through increased energy use resonate with the intellectual bases of many of today's development and modernization schemes. Furthermore, White's work raises questions about the relationship between the scale of human enterprises and their enduring effects on the environment. Following approaches in historical ecology, Charles Redman gives long-term depth to human environmental modifications, as he surveys the archaeological record for ecological change wrought by the growth of ancient cities. In modern times, large-scale development usually translates into efforts at industrialization, the object of James Ferguson's discussion in the section's third chapter.

Ferguson says that government development projects cause social as well as environmental problems. Vandana Shiva describes how development programs involve men and women differently, drawing a connection between sexism and environmental destruction. Shiva argues that those who benefit from economic development are rarely those who bear its costs. This polemical piece contrasts with Beckerman's chapter, in which he argues that economic development is necessary for environmental protection. Collectively, the contributions to this section ask, what is the goal of economic development? How do the problems of development overlap with those of environmental destruction? Does development inevitably destroy nature? In this section's final contribution, Alan Fricker explores definitions and possibilities for sustainable development. In comparison to Netting's earlier, pointed definitions of sustainability in smallholding agriculture, Fricker offers an expansive vision infused with spirituality.

This section's concern for the differences between policy ideas and practices bridges the abstract themes of previous sections with the following, more topical, chapters. This section also raises the issue of consumerism (addressed in Section 7) by questioning the consequences of certain kinds of economic behaviors. Much of the economic activity described in this section ultimately aims to increase the production and sale of consumer goods. Many people have responded to the environmental changes wrought by consumer-oriented industrialism by promoting concepts of sustainable development. Thematically, sustainable development reappears in Sections 4, 6, and 7. Recalling the optimism that infused earlier discourses about progress, enlightenment, and development, various contributors evaluate new ideas about harmony with nature in light of changing attitudes to earlier panaceas.

Energy and Tools

Leslie White

A culture, or sociocultural system,[1] is a material, and therefore a thermodynamic, system. Culture is an organization of things in motion, a process of energy transformations. Whether it be chipping an arrowhead, catching a fish, hoeing a hill of beans, avoiding your mother-in-law, calling your father's sister's son "father," performing a ritual, playing a game, regarding a churinga with awe, or breathing a silent prayer, the event is an expression of energy expended.[2] "Culture" is but the name of the form in which the life forces of man as a human being find expression. It is an organization of energy transformations that is dependent upon symboling.

Culture, as a thermodynamic system, may be analyzed into the following factors: energy, tools, and product. As we have seen, culture is a mechanism for serving the needs of man. And to do this it must harness energy and put it to work. The use of energy requires technological apparatus, and we may extend the use of the term *tools* to cover all the material means with which energy is harnessed, transformed, and expended. We shall designate all goods and services capable of serving the needs of man that have been produced or formed by the cultural use of energy, the *product*. Thus, catching fish, shooting game, making pottery, cutting hair, piercing ears for pendants, filing teeth for beauty's sake, weaving cloth, and a thousand and one other cultural processes are examples of the control and expenditure of energy by instrumental means in order to serve some need of man. We may, then, think of the culture process in terms of motive power, means of expression, and satisfaction of need. This conception can be expressed by a simple formula, $E \times T \rightarrow P$, in which E represents the energy involved, T the technological means of utilizing it, and P, the product or result which serves a need of man.

By *energy* we mean "the ability to do work." "… Energy and work are interchangeable terms" says Soddy;[3] one is defined in terms of the other. Thus, a stone is moved from here to there, or its shape is changed by chipping or grinding. Energy is expended; work is done. Energy has both quantitative and qualitative, or formal, aspects. Quantitatively, energy is measurable in terms of definite and standard units, such as ergs, calories, British thermal units, etc. One magnitude of energy may therefore be compared with another. Qualitatively, energy is manifested in a great variety of forms: atomic, molecular, stellar, galactic, cellular, and metazoan, as well as cultural. From the standpoint of cultural systems, solar radiation, plants, animals, wind, water in

motion, fuels of various kinds, molecules, and atoms are significant forms of energy, significant because it is in these forms that they are, or may be, incorporated into cultural systems. It is understood, of course, that energy is neither created nor destroyed; it is merely transformed. Cultural systems operate, therefore, only by harnessing energy in one form or another, and by transforming it in the production of human need-serving goods and services.

Cultural systems vary as means of harnessing energy; some are more effective than others. They may be compared in terms of coefficients derived by relating amount of energy harnessed and expended in a given period of time to the number of human beings embraced by the system. Thus one cultural system may harness and use x units of energy per capita per year,[4] another, $3x$, or $10x$. The significance of this coefficient lies, of course, in the relationship between amount of energy harnessed, on the one hand, and the number of human beings whose needs are to be served, on the other. The individual human being thus constitutes the unit in terms of which human need is measured and serves, therefore, as the constant against which varying quantities of energy are measured. Thus, we can compare cultures in terms of amount of energy harnessed and expended per capita per year. Or we can make our comparisons in terms of *power*, the rate of doing work, and classify cultures in terms of horsepower per capita.

The source of energy with which cultural systems were activated at the very beginning of man-and-culture history was, of course, the human organism. The energy with which tools, beliefs, customs, rituals, and sentiments were first organized into a functioning system was derived from man himself; he was, so to speak, the power plant that supplied the first cultural systems with their motive power. The amount of energy derivable by a cultural system from this source is of course small. An average adult man is capable of generating about one-tenth of one horsepower, or 75 watts. But the power coefficient of a cultural system deriving all its energy from human organisms would not be 0.1 horsepower per capita, by any means. When everyone is considered, males and females of all ages from helpless infants to the old and feeble, the sick and crippled, the average would be much less, possibly no more than 0.05 horsepower per capita.[5] Since the amount of human need-serving goods and services produced is proportional to the amount of energy harnessed, or horsepower generated, per capita, other factors remaining constant, a cultural system activated by energy derived from the human organism alone would represent the minimum in the range of capacities of cultural systems. From the standpoint, then, both of energy, or power, per capita and amount of human need-serving goods and services produced per capita, cultures that have the energy of human organisms only, under their control and at their disposal for use in the service of human needs, are at the bottom of the scale.

There is room for variation among cultural systems activated by human energy alone. In our formula $E \times T \rightarrow P$, E, the energy factor, may vary with daily calorie consumption. T, the tool factor, varies with degrees of efficiency. Quite apart from natural habitat, therefore, which varies from tribe to tribe and from place to place, we are confronted with variation of cultural systems. Amount of energy harnessed per capita per year is the basic factor in this situation; the other two are meaningless or non-existent without it. Without energy, tools would be meaningless, no work would

be done, no product brought forth. The energy factor provides us, therefore, with an objective and meaningful yardstick with which to measure these, and all other, cultures. A culture is high or low depending upon the amount of energy harnessed per capita per year. At bottom, then, cultural development is the process of increasing the amount of energy harnessed and put to work per capita per year, together with all the consequences attendant upon this increase.

Animal husbandry and agriculture are alike, therefore, in being means of extending control over the forces of nature and of advancing culture as a consequence. But these arts are not equal in their potential capacities for culture building; agriculture has a much greater capacity for culture building than has animal husbandry. The difference in their respective capacities rests upon a simple zoological fact: herds and flocks must feed upon plants; cultivated plants harness solar energy directly. A pastoral system, for all its control over animals, still rests upon a wild-food basis in the last analysis: the plants upon which the herds or flocks feed. The growth and abundance of these plants lie outside cultural control. If pasturage fails, the herds diminish or die. Control over forces of nature is greater and more immediate in agriculture. Plants harness solar energy directly. Fields may be fertilized, excess water drawn off, crops irrigated, advantages derived from use of hotbeds, and so on. It goes without saying that the control exercised through agriculture, though greater than that in animal husbandry, is never complete and perfect; the farmer is of course never wholly immune from natural disaster. But the extent to which culture can develop on a pastoral basis is limited, theoretically and practically. It cannot develop beyond the limit set by the natural production of pasturage. Attempts to increase herds beyond this point merely produce the opposite effect: a diminution of herds as a result of deterioration of pasture caused by overgrazing. In the agricultural arts, on the other hand, there may be a limit to the extent to which human need-serving goods can be produced per unit of human labor, but this limit has not been reached even to this day. Indeed, we seem not to be close enough to it yet even to foresee it and to distinguish its characteristics.

It should be kept in mind that in our discussion thus far, we have been concerned with only one aspect of these processes, namely, the energy factor. We have not dealt with the tool factor at all so far, and we have ignored environment completely. It is obvious that every culture is determined by instrumental and environmental factors as well as by that of energy, but it is convenient and desirable to treat each one singly while disregarding the other two. In considering the culture process, we may think of any two of these factors as constants while we vary the third. Culture will vary, therefore, as the variable determinant varies. Thus, in the formula $E \times T \times V \rightarrow P$, in which E, T, and P have values as before and V stands for environment, we may hold any two of the three determining factors constant and vary the third. P, the total product, or degree of cultural development, will then vary accordingly. The status, or degree of development, of any actual cultural system will, however, be determined by all three factors working together.

Environment. Every cultural system exists and functions in a natural habitat, a collocation of flora, fauna, topography, altitude, meteorologic conditions and forces, and so on. And every culture is of course affected by these environmental factors. But the

relationship between culture and environment is not a one-to-one correlation by any means. Environment does not "determine" culture in the sense that "given the environment we can predict the culture."[6] Environments vary, and their influence and effect upon cultures vary likewise. Some habitats are suitable for agriculture, a pastoral economy, or fishing, manufacturing, etc.; others are not; they may even render certain types of cultural adjustment to nature impossible. But the relationship of culture to environment is determined to a very great extent by the degree of cultural development. The region now known as Kansas was not suitable for agriculture for a people with a culture like that of the Dakota Indians in A.D. 1800. The same region is not suited to a hunting economy now. Whether the coal and iron deposits, or the water-power resources of a region will be exploited or not depends upon the degree of development of the culture of that region. This observation helps to make explicit and apparent an important generalization about the relationship between culture and environment: features of the natural habitat become significant only when and as they are introduced into cultural systems and become incorporated in them as cultural elements. The coal and iron of western Europe, or the water power of England, become significant only at certain levels of cultural development. The flowing streams of England were relatively insignificant culturally in A.D. 1200; they became tremendously important as sources of power for industry in the seventeenth and eighteenth centuries; with the development of the steam engine and the exploitation of coal resources, they became relatively insignificant again. Thus we see that although natural habitat exerts an influence upon culture, we can learn more about this influence from a consideration of the culture and its degree of development than by a mere inventory of environmental features.

The Role of Tools. The technological process may be analyzed, as we have noted earlier, into two components or aspects. On the one hand, we have energy, harnessed and expended, and on the other, the mechanical means with which this is accomplished. A woman digs edible roots with a stick; a man shoots a deer with an arrow; corn is ground with a metate or a water mill; an ox draws a plow. Having sketched the course of technological development from the standpoint of energy, we now turn to the aspect of tool, or instrumental, means.

As Ostwald has pointed out, the structure, use, and development of tools may be illuminated by thinking of them in their relationship to energy. "When a man took a staff in his hand," he says, "he increased the radius of his muscular energy … and was therefore able to apply it more usefully. By the use of a club he could accumulate his muscular energy in the form of kinetic energy and bring it into play with sudden force when the club alighted. By this means it was possible to perform work which could not have been accomplished by the unaided activity of his muscular energy in the form of pressure. …"[7]

In the bow and arrow, muscular energy is transformed into form energy of the drawn bow, from which it may be released instantaneously and with great intensity. In the crossbow, muscular energy can be stored up indefinitely.

There is an aspect of economy as well as of mechanical efficiency to be considered in evaluating the role of instrumental means of controlling energy. One type of tool

may be more economical though no more efficient, or even less efficient, than another. *Economy* is here measured in units of energy required for the production of the tool. Early copper axes or knives were little, if any more, efficient than the stone implements they replaced, according to Childe.[8] But if a stone ax were broken, it would be difficult, if not impossible, to repair it so that another would have to be manufactured to replace it. The copper axe, on the other hand, could be repaired with relative ease. The cost in labor of the stone implement was much greater than that of metal, and so the latter would be preferred at equal degrees of efficiency. The same principle will apply to higher levels of technological development.

We may summarize our discussion of energy and tools in the following law of cultural development: *culture advances as the amount of energy harnessed per capita per year increases, or as the efficiency or economy of the means of controlling energy is increased, or both.*[9] Progress was due almost wholly to increase of efficiency or economy of mechanical means in the first stage of cultural development. In subsequent eras development has come from both sources.

It must not be assumed, however, that these two factors, energy and mechanical means, are equally significant merely because both play a part in cultural evolution and progress. The energy factor is much more fundamental and important. The fact that energy is of no significance as a culture builder without mechanical means of expression in no way invalidates this evaluation. If energy is useless without mechanical contrivances, the latter are dead without energy. Furthermore, no amount of addition to, or improvement of, mechanical means can advance culture beyond a certain point so long as the energy factor remains unchanged. Culture would retrogress, even if its tools and machines were perfect—and precisely because they were perfect—if the amount of energy harnessed per capita per year were diminished. On the other hand, an increase in amount of energy harnessed will not only carry culture forward because of this increase but will foster mechanical improvement as well. Mechanical instruments are indeed essential. But they are merely the vehicle, the means, the scaffolding, the skeleton; energy is the dynamic, living force that animates cultural systems and develops them to higher levels and forms.

NOTES

1. We define *sociocultural system* as the culture possessed by any distinguishable group of people.

2. David Burns, Grieve Lecturer on Physiological Chemistry at the University of Glasgow, reports on experiments in which the amounts of energy to give lectures were measured, the measurements being expressed in mathematical terms. See *An Introduction to Biophysics*, 1921, p. 329.

3. Frederick Soddy, *Matter and Energy*, Oxford University Press, London, 1912, p. 25.

4. When we deal with cultures in terms of magnitudes of energy harnessed and put to work we must specify the period of time during which this takes place, since magnitude varies with length of time. We select a year as our unit of time because, in addition to being convenient and easy to work with, it embraces a complete cycle of the seasons, and hence the whole gamut

of the routine activities of any cultural system. If, however, we deal with cultures in terms of horsepower, no time period need be specified since horsepower is the rate of doing work.

5. The amount of energy that the human organism is capable of producing will depend largely upon the food-energy intake. Naturally we do not have figures for the diet of primordial man, nor even adequate data for present-day preliterate peoples. We do, however, have statistics for modern nations. The range within which the amount of food energy consumed per capita per diem varies is interesting and significant, especially with respect to animal proteins:

Daily Food Supply per Capita

	All foods (calories)	Percentage of United States	Animal proteins (ounces)	Percentage of United States
United States	3,098	100	1.8	100
Sweden	3,171	100.2	2.2	122
Japan	2,230	72	0.4	22
China	2,234	72	0.2	11
India	1,976	64	0.3	17
Mexico	1,855	60	0.7	40

SOURCE: *Point Four*, a mimeographed publication of the U.S. Department of State, 1949, p. 109.

6. "While it is true that cultures are rooted in nature, and can therefore never be completely understood except with reference to that piece of nature in which they occur, they are no more produced by that nature than a plant is produced or caused by the soil in which it is rooted. The immediate causes of cultural phenomena are other cultural phenomena. …" A. L. Kroeber, "Cultural and Natural Areas of North America," *University of California Publications in American Archaeology and Ethnology*, 1939, p. 1.

7. Wilhelm Ostwald, "The Modern Theory of Energetics," *The Monist*, vol. 17, p. 511, 1907.

8. V. Gordon Childe, *What Happened in History*, 1946, p. 69.

9. "… Progress of technical science is characterized by the fact: first, that more and more energy is utilized for human purposes, and secondly, that the transformation of the raw energies into useful forms of energy is attended by ever-increasing efficiency." Ostwald, op. cit. Ostwald is here speaking of technical science. But if cultural development as a whole rests upon and is determined by technological advance, what he says here would apply to the evolution of culture in its entirety.

Chapter Fourteen

The Growth of World Urbanism

Charles Redman

One of the dominant trends in world history during the past 5000 years has been the emergence, spread, and continued growth of aggregations of people to the point that in modern times, each decade sees a larger majority of people living in cities worldwide. With an increasing reliance on an expanding food base provided by agrarian innovations and improvements in the transport of foodstuffs, it became possible for larger and larger numbers of people to exist and to live in nucleated locations. This process occurred at different times in each part of the world, but there is good archaeological evidence for what we are willing to call cities in at least Mesopotamia by 3000 B.C. and soon thereafter in many other parts of the Old World.

The emergence of urban society introduced a whole new set of human-environmental interactions. One set of impacts derives from the fact that there were just more people in the world, requiring greater food production. A second impact is the increased need for building materials—wood, stone, and fired bricks—to construct these cities. A third impact is the territory itself that is given over to settlement, creating urban ecosystems. A fourth impact is really a series of newly established interactions caused by the nature of urban society with its industry, trade, and hierarchical administration. Just as settled village life allowed people to invest their labor in permanent facilities and to accumulate more goods, urban life advanced those processes to new levels. The creation and concentration of goods and the productive capacity to create more became the hallmark of urban society. All of this took a heavy toll on the environment and solidified a new set of relationships between humans and their environment.

The increased demands put on local environments by growing urban populations were partly mitigated by the greater labor invested by these people to transform their landscapes to sustain a higher level of production. Among the many efforts employed to increase productivity, irrigation of bottomlands and enhancing hill slopes through terracing are two of the most fundamental innovations of humankind. Redistributing available surface water through the construction of irrigation canals made agriculture practical in many otherwise unsuitable regions and often increased the productivity of those and other regions several-fold. The construction of irrigation works was

limited to favorable geographic settings where potential farmlands were relatively flat and the river or other sources of water were elevated sufficiently above the fields to allow for gravity to carry the water through the newly dug canals. Other, more complex water-management techniques were also used, such as underground canals (quanats, see English 1966; Schreiber and Rojas 1988), or raised fields (chinampas, Coe 1964).

Irrigation must have started on a small scale with rather simple constructions, but as its value became apparent, more effort was invested in new construction to divert more water into the canals and to extend the canal system to reach greater areas of potential farmland. Because of changing water levels and clogging by waterborne silt, canals and their intakes required substantial additional labor to maintain, in addition to the normal labor required to guide water from field to field. Beyond this, some personnel had to be devoted to making decisions about the allocation of available water among the users and insuring that these directives were carried out. With irrigation water also came potential problems, the most obvious being the susceptibility of low-lying farmlands to disastrous flooding and the longer-term problem of salinization. To combat flooding from rivers that had agraded above the level of the surrounding fields, people from early historic times until today have constructed protective levees between the river and the settlement or fields to be protected. This, of course, is effective up to a certain level of flooding, but changes the basic hydrology of the area and can multiply the damage when the flood level exceeds the height of the levee.

Salinization is caused by an accumulation of salt in the soil near its surface. This salt was carried by river water from the sedimentary rocks in the mountains and deposited on the Mesopotamian fields during natural flooding or purposeful irrigation. Evaporation of water sitting on the surface in hot climates is rapid, concentrating the salts in the remaining water that infiltrates through the soil to the underlying water table. Conditions of excessive irrigation bring the water table up to within 18 inches, where capillary action brings it to the root zone and even to the surface, where the high concentration of salts would kill most plants.

Solutions for salinization were not as straightforward as for flooding, but even in ancient times it was understood that the deleterious effects of salinization could be minimized by leaching the fields with additional water, digging deep wells to lower the water table, or instituting a system of leaving the fields fallow (Adams 1978). The first two cures required considerable labor and the third solution led to a diminished productivity, not often viewed as a likely decision in periods of growing population. An effective irrigation system laid the foundation for many of the world's early civilizations, but it also required a great deal of labor input and often favored societies that were centrally controlled.

Another major option available to growing agrarian societies to meet their food-producing needs is to expand the land under cultivation, which often means to farm less-desirable hill slopes surrounding the favored low-lying valley bottoms. Since bringing irrigation water to a hill slope is usually impractical, the key is effective utilization of rainfall. Rainfall either soaks into the soil or runs off of it led by gravity. A soil that is deep, well-structured, and covered by protective vegetation and a mulch of plant residues will normally absorb almost all of the rain that falls on it, given that the slope is not too steep (Hillel 1991:97). However, soils that have lost their vegetative

cover and surface mulch will absorb much less, with almost half the water being carried away by runoff in more extreme situations. This runoff carries with it topsoil particles, nutrients, and humus that are concentrated in the topsoil. The loss of this material reduces the thickness of the rooting zone and its capacity to absorb moisture for crop needs. Sufficiently violent runoff erodes away the soil until bedrock is exposed, leaving only protected patches of soil and diminishing the overall productive potential of the landscape. This erosion may in turn have a deleterious effect on the lowlands that receive this runoff, often clogging waterways and burying productive soils below sediment of coarser material. Hence, for growing urban populations to expand their farming endeavors to the surrounding hill slopes, they had to devise ways to impede runoff and maintain the depth and fertility of the soil.

The most direct solution to this problem of slope runoff was to lay lines of stones along the contours of the slope and hence, perpendicular to the probable flow of water and sediment. These stones would then act as small dams, slowing the downhill flow of water and allowing more water to infiltrate and soil particles to collect behind the dam. The success of this type of approach led to its use in many different circumstances and societies. Among many early civilizations, including those of the eastern Mediterranean, elaborate constructions we refer to as terraces were an essential element of their agricultural systems. They were widespread in the Levant as early as the second millennium B.C. and at least in a simplified form they were probably employed millennia earlier (Simmons 1989).

The objective of building terraces was to transform sloping ground into a series of nearly horizontal arable plots with adequate control of water runoff and minimal erosion of the soil. When these terraces were constructed, the natural patterns of drainage were altered, as was the development of soil behind the terrace walls. Overall, the impact of well-planned terracing was to allow farming in otherwise unusable areas and to increase the sustainability of plots that already were in use. The costs, however, were great both in terms of labor for initial construction and for the continual maintenance needed to keep the walls intact.

Mesopotamia

It was a study conducted in the Near East that first demonstrated the value of archaeology in understanding human impacts on the environment and possible methods to ameliorate these problems. In 1958 Thorkild Jacobsen and Robert McC. Adams published an article in *Science* that spoke directly to the problems caused by salinization of farmlands in lower Mesopotamia 4000 years ago and what modern inhabitants of that region might learn from the past (Jacobsen and Adams 1958). Over the years since 1958, sporadic papers have continued to appear on this subject (Gibson 1974; Gelburd 1985; Dickson 1987; Redman 1992), and salinization is often expressed in textbooks (Redman 1978; Nissen 1988) as a major problem leading to the reduced political importance of southern Mesopotamia, even though there remains considerable debate (Powell 1985) over the cultural context that led to this environmental "catastrophe."

The case study focused on here is that of the Ur III Dynasty of southern Mesopotamia. Information on this is gleaned from the original Jacobsen and Adams article (1958) as well as subsequent pieces by each of them (Jacobsen 1982; Adams 1978). There remains some controversy over whether the changes cited were as grave as suggested or whether these causes were in fact at fault. The use of early textual accounts and incomplete archaeological investigations often leave the most interesting interpretive models as hypotheses rather than confirmed facts. If we were to avoid these still tentative reconstructions because of their uncertainty we, as archaeologists, would be ignoring what might become our greatest contribution to modern society. Whether or not subsequent studies show that this view of the Ur III situation holds true, it is likely that other Near Eastern civilizations experienced similar cycles of political and economic growth followed by environmental and subsequent social decline, both before Ur III (as suggested by H. Nissen, personal communication) and after it (Adams 1978).

Four thousand years ago, the Ur III Dynasty was situated in the southern half of Mesopotamia, and consisted of numerous cities, each inhabited by several tens of thousands of people and supported by an associated hinterland of farms and villages. This was one of the great early societies of Mesopotamia with well-developed writing, a system of laws, extensive trade networks, and ambitious builders, and it was a period of strong centralized political control (Edzard 1967; Nissen 1988). The economic system relied heavily on irrigation agriculture with vast field systems along the Euphrates River and canals leading from it. Winter-cultivated cereals were the main crops, although there were many secondary crops. Herding was also important, with contemporary records indicating as many as two million sheep were being kept.

The aspect of Ur III society emphasized here is the rapid rise in the centralized control of the political hierarchy and paradoxically how that contributed to an era of declining agricultural productivity and environmental damage. Centralized control of the once independent city-states was a logical objective of the growing power of the Ur III rulers. Centralization gave them greater access to labor pools, military conscripts, trade goods, and agricultural produce. More telling from our perspective, centralized control increased the potential for the production of food and other goods. Some of this increased productivity was achieved through increased specialization of production, but the majority resulted from centralized management of the construction and maintenance of water works and the allocation of water in the growing irrigation network that fed the Mesopotamian fields. Moreover, it was a logical decision for Ur III rulers to extend the land served by irrigation and to increase the capacity of the existing canal system so more water could be brought to the fields. This would allow more water to be used, particularly in flood years. Another decision that would have seemed logical under pressure to produce more, would be to shorten the period of time fields were left fallow. But the same decisions that brought short-term increases in production, as evidenced in the high population density and great construction projects of the Ur III period, rapidly undermined the agrarian base and led to a long period of diminished productivity. The major villain was salinization of the soils. Although there is general agreement that salinization was, as Hans Nissen says, "one of the greatest countrywide catastrophes," there remains considerable debate over the causes.

Written records of temple storehouses of the period allow scholars to reconstruct with some certainty the relative productivity of fields and the crops being planted. A long-term decrease in productivity occurred between 2400 and 1700 B.C. At the outset of this period, wheat was an important crop, accounting for at least one-sixth of the cereals produced. But as salinization increased, people slowly shifted to the more salt-tolerant barley, so that by the end of the Ur III Dynasty in 2000 B.C., wheat made up only one-fiftieth and by 1700 B.C., it appears that wheat was totally abandoned in the region (Jacobsen 1982). The end of this decline in wheat production coincides with a long period during which centralized political control had broken down. Many cities were abandoned or reduced to villages, and the emphasis in agriculture shifted. Whereas during the height of Ur III control maximizing surplus production for central rulers dominated, during the subsequent political breakdown, the object became satisfying the needs of local populations in a more self-sufficient localized production mode.

The evidence from the uplands surrounding Mesopotamia that is only beginning to be collected by a couple of projects has provided a consistent set of results. Naomi Miller has examined macrobotanical remains from two widely separated sites in upland Iran and Turkey (1992). She found that over time during the second and third millennia fuel wood was brought into the settlements from farther and farther away. There was also a shift to a greater reliance on dung over wood as a source of fuel. Both patterns indicate that forests were being clear-cut in the vicinity of the settlements. As was suggested for the vicinity of Ain Ghazal, domestic needs, goat browsing, and field clearance would essentially deforest the immediate vicinity of the villages, while lime production and charcoal making would consume additional quantities of wood, probably cut at a location farther from the settlement. This would extend the effective area of deforestation even more.

Another study, this time of pollen taken from a core from the bottom of a lake in south central Anatolia, reveals a more broadly regional pattern of vegetative change over the past 10,000 years. During the last Ice Age, the region was a glacial, steppe environment with few trees and mainly grasses (characterized as *cheno-artemisia*). During the early Holocene (ca. 9000 B.P.), when the first farming villages would have been established, the region hosted a mixed forest of oak, pine, and juniper. By the mid-Holocene (ca. 3000 B.P.) the oak in the forests was drastically reduced; pine, whose pollen can travel great distances, continued; and cereal grasses increased. Recent pollen evidence is dominated by pine pollen that is traveling from mountainous refuge areas and a modest occurrence of cereals, reflecting the reduction in agriculture in the region.

The traditional lore today in the Near East to explain deforestation and localized failures of farming blames it on the Ottoman Rule of the region during the last few centuries. It is said that the denuded lands are largely the result of overgrazing of goats during the period of Ottoman Rule and that in ancient times these were the lands of "milk and honey." This assertion is probably true to some extent in that the Ottoman political system discouraged local infrastructure development and encouraged small-scale social groups that would rely on herded animals. However, this interpretation is an oversimplification that takes our attention away from the needs of the

domestic hearth and industrial kiln from as far back as the earliest civilizations 5000 years ago. The goat is the most destructive of the grazers, but its effects are largely secondary; that is, it usually is not the one to destroy the trees themselves, but only the shoots, leaves, and young sprouts. This does diminish the primary production of the trees as well as keep young trees from reestablishing themselves. Thus, goats are strong contributors to keeping an area from regenerating trees and ground cover and consequently exposing it to the elements and leading to degradation of the fertility of the topsoil and, ultimately, to complete loss from erosion. Complementing these pressures is the hearth and kiln that need not just twigs and thin branches, but timber as well. The heavy weight of wood also dictates that when possible, people will completely denude local sources, rather than draw on larger, more distant sources in an effort to conserve forest growth. The importance of securing fuel for the domestic hearth continues to this day to force the gathering of forage from great distances.

Mexico and Central America

Mexico and Central America were home to a wide variety of impressive prehistoric societies. The Maya to the south and a variety of Central Mexican societies to the north each built strong agrarian systems that supported very high populations and elaborate urban centers (Coe 1982). The main New World crop in North, Central, and South America was corn. First domesticated about 5000 B.C., or somewhat earlier, corn started out as a very small cob, not economically viable as the dominant food source. This differs from Old World species like wheat that were nearly as productive in the wild as under early cultivation. Early forms of corn were pioneering weeds basically used by Central Americans as a back up or famine food. However, over a long period of low-level use, the nature of corn changed, with larger cobs and kernels being selected for by the early users. It took three or four millennia of slowly increasing the size of the cob, the number of kernel rows, and the size of individual kernels before corn as a crop became so productive that people could depend on it as their primary food. With this change, somewhere around 2000 to 1000 B.C., it became practical to invest the labor to clear fields and to establish year-round villages that could rely on corn harvests and stored corn for their primary subsistence. During this same period other crops were also experimented with and ultimately domesticated by New World groups. Gourds, squash, and beans are among the most important, but altogether more than forty species of economic plants were domesticated in the New World.

Once well-developed, corn and other New World domesticates offered people an abundant source of food leading to increasing population and social advance. The Maya of Central America were among the most innovative people of the Americas, having many accomplishments in the arts, science, and human organization. Well before the beginning of the Christian era, the Maya and their associates had built enormous ceremonial and administrative centers throughout their lands and developed into a tightly controlled society that thoroughly settled the landscape between centers with scattered farming households and hamlets. The geography of the Mayan

homelands did not lend itself to centralized irrigation works, but rather was most suitable for extensive fields of slash-and-burn (milpa) agriculture. This ensured that the agrarian population would have to remain scattered to be close to their fields and that a maximum amount of land would have to be under tillage to support the growing population. In fact, as many as 8 to 10 million people lived in the Mayan domains 1000 years ago, a figure not surpassed until the recent decades of this century.

The Mayan homelands of the Yucatán, Belize, Guatemala, and parts of Honduras were well watered and primarily lowlands. The upland zone, focused in Guatemala, had relatively well-drained soils that were favorable to maize agriculture, especially in the valley bottoms. The Mayan lowlands were characterized by less well-drained soils in an environment of flatlands with scattered lakes. Classic Mayan civilization, best known for its ceremonial centers with earth-filled pyramids topped with carefully ornamented temples, was well established by A.D. 300. The construction and decoration with stucco relief of pyramids and temples absorbed tremendous amounts of Mayan labor and resources. These centers were the focus of religious activities, trade relations, and whatever political integration existed at the time. The Maya were remarkable astronomers and regulated religious events with a sacred calendar that was calibrated by an extremely accurate secular calendar. Public ceremonies utilizing the temples, pyramids, and ritual ball courts demonstrated the power of the elite, as did the rising tide of militarism. Despite their many talents, the zenith of Mayan ceremonial centers and the organized society they represented was not especially long lived. By A.D. 900 to 1000 there is widespread archaeological evidence for the abandonment of most of the major centers and an overall drop in the population of the region. Clearly there is a breakdown in the political and social organization that had led the Maya to such impressive accomplishments. Various theories have been put forward as to the cause of this "collapse." Primary among them is that degradation of the environment through excessive agricultural practices played a major role (see Culbert 1973). Archaeologists are beginning to accumulate evidence to evaluate the importance of human impacts.

The Petén region of lowland Guatemala was the subject of a pioneering study of prehistoric human-environmental relations by the Central Petén Historical Ecology Project (CPHEP; see Rice 1996). This project was designed primarily to learn about the genesis and change of the tropical forest, rather than focusing on the prehistory of the Maya. However, the Maya were clearly one of the central agents of environmental transformations, being a "strain" on the natural ecosystem. One of the goals of this study was to delineate changes in the forest ecosystem that could be attributed to climate change versus those resulting from human impact. May to October is the rainy season in the Petén, with 70 to 90 inches per year. A high canopy of mahogany, breadnut, and sapodilla trees dominates the landscape with a middle canopy of avocado and other small trees and shrubs. In temperate regions, such as those we discussed earlier in this volume, forest soils contain most nutrients that sustain plant growth. When a temperate forest is cut down, it is the soil that stores the nutrients until they are utilized by subsequent growth.

In contrast, it is the vegetative cover rather than the soil that holds most of the nutrients in tropical forests, such as those of the Petén (Rice and Rice 1984:8). More than

75% of the nutrients in a tropical forest ecosystem are in the living vegetation and the dead organic matter on the ground, which is rapidly recycled into new growth rather than enriching the soil. Because of this a tropical forest can regenerate almost all of its biomass within a 10-year period, versus up to 100 years in most temperate settings. If the trees and vegetation that are cut are also burned, this recycling is even faster. Hence, a slash-and-burn strategy can transfer the abundant nutrients in the tropical cover to newly planted crops and yield impressive returns. At the same time, slash-and-burn exposes the soil to potential erosion and therefore is best conducted in selected topographic settings and under close management.

We know from historic periods that this region can efficiently support a swidden or milpa agricultural system, where trees are cut from a plot of land before the dry season and burned at the end of the dry season. Then it is used for two years of crops and left fallow for three to six years. This type of rotation has been known in recent times to comfortably support a density of about 25 people per square kilometer. However, archaeological evidence from this region suggests that at certain times and in some locations, the population density attained 250 people per square kilometer (Rice 1996: 196). Obviously, Mayan farming strategies were well developed and closely attuned to the potentials of the environment. Houses were dispersed across the countryside to allow farmers easy access to the maximum amount of arable land. Instead of transforming the entire landscape to increase production, the Maya grew a diversity of crops on the same field and may have focused on the naturally low-lying areas, or *bajos*, with their relatively fertile soils for labor investments such as raised fields. The efficient production and centralization of farm products allowed the growth of enormous ceremonial centers such as Tikal, which thrived from 100 B.C. to A.D. 900. However, even Tikal entered a period of decline in A.D. 800, with the last dated monument being constructed in A.D. 909. The general belief is that the land had been filled up for some period, and with declining fertility, the dense population could not be supported and fell into rapid decline, requiring emigration. Archaeologists estimate that within a few centuries, population had fallen by 80% and most of the formerly majestic ceremonial centers had been abandoned.

As part of the Central Petén Historical Ecology Project, Don and Prudence Rice and Bill Deevey studied several lake basins from a number of perspectives: archaeological settlement patterns, pollen record, erosion of sediment, and chemical loss of soils (Rice and Rice 1984). Their unit of study was the lake and its drainage basin. One can relatively easily define the surface boundaries of each lake basin and then monitor the movement (flux) of nutrients and sediments between the terrestrial and aquatic portions of the system (see Binford and Leyden 1987). Their model views an ecosystem as sustaining itself on the flow of chemical elements drawn by vegetation from rocks, soil, and air, carried either in dissolved or suspended form in water into the lake. The presence of humans increased this flow. Thus a lake basin can be thought of as a *trap* in a closed system, revealing activities that influence the terrestrial components of the catchment basin.

By examining sediment cores taken from lake bottoms, these authors found that the deposition of phosphorous and silica were both amplified over normal levels during the period of Mayan occupation, indicating a significant disturbance of the

surrounding landscape. Phosphorus is rare in the lowlands and is crucial for agrarian success; hence tracing its movement through the environment is a meaningful measure of impact on chemical nutrients. Erosion leads to a permanent loss of phosphorus from the soil, since it is generated very slowly from underlying bedrock. Because of this, in modern times phosphorus is one of the major elements added to soil in the form of chemical fertilizer. It is believed that activities such as burning vegetative cover and constructing stone buildings released large amounts of phosphorus into the soil (Rice and Rice 1984:21). Phosphorus deposited in lake bottoms reflects the active transport through erosion of the chemicals from surrounding topsoil, where it exists both because of natural generation from bedrock as well as from human waste, food products, mortuary, and disintegration of stone building materials. The researchers found that the phosphorus deposition in the lakes increased roughly in a linear relationship with the archaeological evidence of population increase, reflecting probably both more phosphorus in the soil and more erosion of this soil into the lake bed. This loss of a key element, and other components of the topsoil as well, led to a slow, but progressive undermining of the productivity of the lands around the lakes, particularly the uplands that would be most vulnerable to slope wash.

Silica, being a relatively large-grained component of soils, is a reasonable indicator of the rate of transport of soil in a lake basin (Binford and Leyden 1987). It might reflect a variety of landscape-altering activities that would make the soil more susceptible to erosion, such as deforestation, cultivation, and settlement construction. The researchers found that in Lake Sacnab and especially in Lake Yaxha, silica deposition increased several fold during the height of Mayan occupation (Rice, Rice, and Deevey 1985). Despite this evidence of soil erosion and the implied reduced productivity of local lands, the Maya lived here and elsewhere for a long period of time. Clearly the Maya understood the tropical forest ecosystem well enough to maximize the exploitation of the region and to conserve available resources so as to thrive for centuries in most locations. Researchers have suggested that the Maya tried not to completely clear the land and to plant it with diverse crops to maintain fertility and minimize exposure to erosion. They also invested heavily in water control to minimize the destabilizing aspects of water flow while maximizing the flow to fields to increase crop yield per hectare (Rice and Rice 1984:27). And finally they organized themselves to move food around the region, buffering localized risks and allowing for concentrations of population.

The picture that comes together from studies of the Petén and the adjacent Mayan area of the Mexican Yucatán reveals an anthropogenic ecosystem through much of the Holocene. The high forest that prevailed in much of that region was largely removed by the farming and settlement building activities of the Mayas as early as 3000 to 4000 years ago (Islebe et. al. 1996). This resulted in a shift toward more open vegetation during much of the Mayan occupation with the maximum deforestation between 1000 and 2000 years ago. The basic drain on the land of dense population, intensive agricultural manipulation, and construction of massive settlements increased to the point were the system was no longer sustainable. Declining productivity must have had a multiplier effect, leading to food shortfalls, reduced labor investment, and political instability. By the end of the tenth century A.D., most of the large settlements of

the Mayan uplands and southern lowlands had been abandoned or at least seriously depopulated. The deterioration seems to coincide with a relatively dry period that would have also put pressure on productivity, making it difficult to determine whether the primary influence was climatic or human (Hodell, Curtis, and Brenner 1995). Without denying this uncertainty, I believe this "collapse" was primarily due to the extended period of intense human exploitation, albeit aided by microclimate variability.

Similar inferences have been drawn from the large research project focusing on and around the Mayan center of Copán in neighboring Honduras (Abrams and Rue 1988). Based primarily on evidence taken from a pollen core in a local bog, Abrams and Rue see a major era of regional deforestation during the Classic Mayan occupation when the forest was replaced by grasses, and then a regeneration of the forest about A.D. 1300, and finally a disturbance once again during this century. They attribute several important uses for wood products that outstripped the supply as the major cause of deforestation. First, the domestic hearth required a continual supply of fuel; second, the production of lime plaster for houses and monuments required fuel; and third, the construction of homes relied on quantities of timber. All of these demands would be tied directly to the size of the local population as would the need to clear or partially clear lands for agricultural fields. Their conclusion is that the deforestation was basically the result of a growing, dense population, and once that declined in the tenth century A.D., the soil and forest regenerated over time. The forest was not threatened again until the twentieth century, when the population once again soared. An interesting footnote to these two studies, is that the tropical rain forest of Central America is only about 600 years old and has grown on the location of what was a largely anthropogenic, agrarian landscape (Islebe et. al. 1996:270).

Hohokam of Southern Arizona

The Hohokam represent one of the great cultural traditions of the American Southwest. Archaeologists have characterized them by the red paint on buff-colored pottery, the fact that they built platform mounds and ball courts, and their highly efficient irrigation agriculture (Gumerman 1991; Crown and Judge 1991). Their settlements are found along the lowland river valleys in the desert region of central and southern Arizona. Their occupations of parts of this region are very long lived, beginning before the Christian era and lasting until almost A.D. 1400. Some of their settlements were occupied for only a few generations, but in selected locations, such as the basin occupied by the modern city of Phoenix, Hohokam communities were present for a millennium. These were very successful farmers who built impressive irrigation systems; their homeland received only six or eight inches of rain per year, far less than corn requires. The Hohokam supplemented their irrigation crops by gathering plants and hunting game. They also developed a regional trading network that brought them products from the uplands to the north and east. Although the population density of the Phoenix basin ebbed and flowed, the persistence of the Hohokam in that location is truly impressive, and to the Hohokam themselves, their existence must have appeared sustainable forever.

The centerpiece of the Hohokam's success was their irrigation system, which was built around the two rivers—the Salt and the Gila—that traversed the broad Phoenix lowland basin. These rivers ran year-round, but their volume varied enormously in response to runoff from rainfall and snowmelt in their catchments during the spring. When these rivers were in flood, they carried substantial quantities of suspended sediment from the uplands. When the fields were purposely watered or accidentally flooded, they received a load of nutrients and new silt that served to regenerate the soil's fertility. This was extremely important in the Southwest, where soil development was slow and remained shallow. The Hohokam took advantage of this resource by building hundreds of miles of canals, some as long as 30 km, to bring water and sediments to increasingly distant fields. Hohokam settlement focused in the wide valley bottoms of the Salt, the Gila, and their tributaries. However, they also utilized the sloping uplands, the bases of alluvial fans, and the arroyo bottoms, where storm runoff could be channeled and would bring major organic and sediment additions to the desert soils.

Other aspects of the Hohokam's food-producing strategy were designed for enhancing productivity and maintaining sustainability. Use of surface water was essential for Hohokam survival, and sources of this water in the desert Southwest were extremely localized. Moreover, locations suitable for water diversion or canal headings in association with downstream flatlands for farming were even more restricted. This made it very disadvantageous for a settlement to move frequently. In addition, the major labor invested in constructing canals and runoff gathering features, and the fact that population was increasing and filling up alternative locations, made it very important for Hohokam settlers to conserve the long-term productive potential of their immediate surroundings. The fact that intensive agriculture results in reduced mobility options for human groups is key to understanding the human-environmental interactions of the Hohokam and many other groups around the world.

The removal of ground cover plant material was mediated by the fact that the Hohokam were "direct gatherers"; that is, they consumed what they gathered rather than depending on domestic animals that consumed the plant material. This meant that a wide range of plants not eaten by humans that might be consumed by domesticates would be spared. It also meant that when humans did consume wild plant material, they often focused on the seeds or fruits, leaving the plant intact. This, combined with the fact that the Hohokam homeland had a relatively warm climate (minimizing the need for fuel to heat their homes), meant that the vegetative ground cover was favored. Potential sources of fuel, such as mesquite trees, were also spared because they produced seedpods that were important sources of food. Wood for fuel and for construction would have had to come from elsewhere. Also, transplanted desert species supplemented the corn, beans, and squash that spread from Mexico. Local varieties of beans were grown, agave was harvested for food and fiber, and other crops like cotton and little barley also contributed. Animals hunted were usually small and found in the vicinity of settlements, such as rabbits. Trapping them may have been a regular part of the daily farming regime. Large artiodactyls, like antelope and deer, were hunted when available, but over time it appears that long-distance hunting parties were needed to bring back these animals, implying that they were no longer available

locally. Also over time, the shift in type of rabbits eaten (from cottontail to jackrabbit) reflects increasingly open habitats. Both of these processes show that despite the conservation efforts of the Hohokam, their presence in high numbers took its toll on the natural vegetation.

Archaeological evidence reveals that there was a dramatic increase in riparian species consumed during the Classic period (ca. A.D. 1250–1400), a time by which the other terrestrial fauna would be depressed in the vicinity of settlements. Although the overall climate and environment of central Arizona has not changed significantly since Hohokam times, the riverine eco-system along the Salt and Gila Rivers has changed dramatically as a result of human-induced alterations, primarily during the past century. In prehistoric times the rivers would have had some water year-round, and they would have flowed actively for substantial periods of time. There would have been lakes and swamps along the river courses, and the riparian areas would probably have been lush and large. Nevertheless, the use of muskrat, beaver, birds, and fish implies a food crisis for the Hohokam. Fish ranked second behind rabbits as a source of animal protein for the Classic period Hohokam (James 1994). In measuring the size of the fish taken during Classic Hohokam times, Steven James found that they were smaller than the modern examples, suggesting to him that already these fish were under pressure and the larger ones had been fished out, leaving only relatively small fish to be caught. James' overall point is that long-term, dense occupation of the Salt-Gila River Valleys by the Hohokam led to the impoverishment of large game in the region, forcing them to use less desirable small game as a source of protein. It even led to the degradation in the river fish available. But this was probably not enough to lead to the abandonment of the region by A.D. 1400.

The Hohokam developed important social institutions to help overcome the difficulties in their environment. As the number of Hohokam settlements grew in an area, they developed coherent groupings we call the Hohokam "community." In the denser situations, this resulted in large central sites with public architecture, such as a ball court and/or platform mound that would be the focus of ceremonial and civic activities. Small settlements, and even distant, part-time hamlets, were involved in the success of these "communities" by being located nearer the agricultural fields and wild food collecting stations. Community organization provided the framework for allocating water from canals and mobilizing labor for construction and maintenance of the canal system.

In sum, the Hohokam developed a distinctively enduring settlement system that outlasted most of their southwestern and North American neighbors. Renewal of fields through waterborne additives permitted a seemingly sustainable agriculture. The yield of domestic crops was supplemented by tended and weedy indigenous species. Because settlements were localized along watercourses, the large surrounding expanses were left uninhabited, allowing for the continued growth of wild vegetation for fuel, craft materials, and edible wild resources. Added to these procurement strategies was an overarching social organization that acted to spread agricultural risks over a sufficient number of environmental zones and allowed for temporary shortfalls that would be buffered through social connections. An example of this relationship is the fact that agricultural fields in the uplands would benefit from a year of heavy

rainfall that might cause destructive floods in the lowland fields. This is clearly a lesson in human organization that adjusted to the requirements of its environment to survive for what, to its inhabitants, must have seemed like an eternity. Nevertheless, Hohokam society came to an end in the fourteenth century, and it is informative to examine the possible causes.

To suggest a possible set of reasons for the demise of Hohokam society, it is useful to look more closely at the relation of environmental factors, irrigation strategies, and social responses. A study of tree ring variability taken from the upper drainage of the Salt and Gila Rivers provides new insight into this complex set of relationships (Nials, Gregory, and Graybill 1989). The basic assumption of tree ring studies is that trees will grow more (i.e., thicker rings) in wet years and less in dry years. In the lower valleys where the Hohokam irrigation system was centered, this should correlate directly with stream runoff and consequent levels of flooding. Although there may be intervening variables, this assumption seems reasonable, and moreover, it provides archaeologists with a useable surrogate measure of annual environmental cycles, at a level of accuracy we seldom attain for the past.

In the Salt-Gila River Valley, settlement grew as people were able to develop irrigation systems using the river floodwaters to advantage. The rivers themselves probably braided as well as ran in a deep channel. Settlement appears to have been along the channels and the main feeder canals. These feeders and the ultimate distributor canals were located some distance downstream from the initial intakes, making each major canal that took water directly from the river the feeder to an entire system of canals that often stretched for many miles downhill. Communities were located along these feeder canals, and it is hypothesized that because they all depended on maintaining the same source of water, they also were held together as a social or political unit (Abbott 1994).

According to the tree ring records there were some big variations in flood levels before A.D. 800, but after that date for over two centuries (until ca. A.D. 1075), there were relatively consistent water levels. This condition favored the construction of an expanded irrigation system in the lower valley. This climate predictability would have encouraged a period of great growth in population and organization. Archaeological evidence confirms this hypothesis, documenting not only a filling in of the Phoenix basin and other lower river valleys, but also the appearance of settlements well up the tributary rivers that displayed Hohokam characteristics. Archaeologists consider these as potential colonies where materials and goods were exchanged with the central valley settlements.

During the next century and a half (ca. A.D. 1075–1250), tree ring evidence indicates that the variability of floods increased with dramatically higher or lower water levels occurring each 20 years or less. Although this situation is less favorable for growth than the preceding centuries, it is within limits that the Hohokam were able to handle without major disruption to their society. Although droughts must have been hard on these people, if they were spaced years apart and reasonable quantities of corn were stored, they could be weathered without enduring trouble. Floods might have had a more serious impact on the system, because they would likely inundate whatever crops were in the fields and destroy irrigation facilities that would take substantial

labor to replace. Regional trading partners were probably sufficient to get the Hohokam through drought years, and the destructive flood years must have been far enough apart for irrigation works to be reconstructed without discouraging the inhabitants.

In the century following A.D. 1250, the climatic situation appears to have become even more erratic, with floods or droughts coming at least once every 10 years. This put tremendous pressure on the survival of the entire system. Crop production in the valleys was seriously diminished, and labor required to maintain the irrigation works dramatically increased. The reduced surpluses of the valley people led to the dissolution of the regional system, which put increased pressure on the valley residents in bad years. To make up for these shortfalls, it is likely that the valley farmers overplanted in their good fields, extended planting to marginal fields, and cut back on fallow periods. All of these strategies would lead to decreases in soil fertility and subsequent productivity. It might also have led to salinization of the formerly most productive soils in the lower valleys. To increase the fields watered during favorable water years, the canal intakes may have been built larger, but during serious floods this would only increase the destructive force of the flood and require even greater labor to replace. At this same time, there was most likely a transformation of the sociopolitical system that emphasized more centralized control, possibly as a response to the increasing environmental threat to the agricultural system (Abbott 1994).

Over the centuries, the Hohokam had developed a very effective human ecosystem. It centered on an agricultural system that relied on major crop production from an efficient but costly irrigation system, supplemental goods from the immediate area and regional partners, and an organizational structure that managed the parts to maintain stability in the face of a naturally variable climate.

The human presence and agricultural activities of the Hohokam on and around the floodplain also contributed to basic environmental problems. Stream channel entrenchment seems to have occurred more frequently and more severely during late prehistoric times than one would expect from climatic factors alone (Waters 1991:155–156). By clearing vegetation from the floodplain and surrounding slopes (*bajadas*), the Hohokam would have inadvertently increased the volume and velocity of surface runoff. Compacted foot trails, short ditches, and even the canals themselves would have concentrated the runoff and further increased its velocity. Taken together, this would seriously enhance the likelihood of serious soil erosion from the slopes surrounding the valley and siltation of the canals on the valley floor.

The longer the Hohokam existed in the same location, the more pressure they put on floodplain dynamics and on the fertility of the soil, but they maintained it through various conservation methods and by supplementing local food with goods brought in by exchange systems. However, when the climate entered a long period of greater variability, including disastrous flooding, it put an additional pressure on the Hohokam system that could not be easily sustained. Their response was to invest more labor in extracting the maximum from the land, but that made the system even more vulnerable to climatic extremes. The production shortfalls also diminished their ability to maintain their regional trading partners and threatened their local organizational control as well. Energy and resources devoted to ceremonial activities and other

cooperative ventures helped hold the system together for generations, but at a cost. To provide for these activities, the agricultural extraction was continually maximized, which cost enormous labor investments and weakened the underlying resilience of the system. When an infrequent but extreme climatic situation arose, the system now could not recover from it, as it probably would have recovered if it had happened a century or more earlier. Nials, Gregory, and Graybill (1989) believe such an event, or series of events, occurred around A.D. 1350. Two years in succession witnessed the highest flood level they had recorded and were followed immediately by one of the driest years on record. The system, already weakened by a century of disruptions, obviously did not overcome this one-two punch. Archaeological evidence shows very sparse settlement in the valley after that date, and the disappearance of many of the traits we have identified as Hohokam from the record.

Human-Land Relationships in Early Civilizations

The main point of the Mesopotamian and Hohokam examples, and I believe of the Mesoamerican examples as well, is that at least in these preindustrial societies, short-term political stability and economic maximization were only achieved by weakening the capacity of the productive system to react to internal and external challenges, and hence, undermined its long-term survival. Cooperative activities in many contexts may help survival of small-scale systems, but as those cooperative ventures become larger and more formalized, their adaptive potential does not always operate. The archaeologists responsible for the Mesoamerican case studies have not yet suggested the social context of the environmental problems they observed, but I would not be surprised if they paralleled the Mesopotamian and Hohokam situations. State ideologies asserted at that time, as do many today, that everyone's interests were served when the interests of the central rulers were served. Yet, many people may not share the rulers' objectives and all elements of the population may not benefit equally from a particular productive strategy. The issue, therefore, is the effective locus of decision-making within the society, how these decision-makers gain their information, and how they perceive their needs.

As successful agrarian societies began to develop managerial and hierarchical social systems, they set in motion forces that reshaped the agricultural decision-making process, which in turn guided human impacts on the environment. There were benefits to these changes, but in many cases they appear to have threatened the long-term stability of human-land relationships. Anthropologist Roy Rappaport considers this type of inefficiency in the flow of information a "maladaptation" that exists in many complex societies and often undermines their continued survival (1978). Gifts to religious orders, taxes for political leaders, or even unequal exchange values in a market are all ways a surplus can be culled from the producers for the benefit of the elite. For these types of asymmetrical flows of goods to exist in a society, there must also be a strong ideology that convinces the producers that it is in their benefit, or at least necessary, to provide these goods to the elite. The promulgation of these ideologies helps to hold together complex societies.

A useful framework for the discussion of the Ur III Dynasty and the other case studies in this chapter is to think of long stretches of history as a series of cycles of growth, stability, and decline. The idea of regions and their dominant societies oscillating in a cyclical pattern is not new, having been proposed by the fourteenth century geographer Ibn Khaldun (1967). This pattern can be measured in terms of any number of key variables, such as population, energy consumption, other technological indicators, centralization of political power, changes in social organization, or agricultural productivity of the landscape. It is likely that many of these factors are interrelated through feedback mechanisms that act to limit excessive growth in order to regenerate overdepleted situations; hence, the appearance of cyclical behavior.

It is generally agreed that population level is a key variable in understanding the seriousness of human impacts. This is true for any animal species: if the population grows too large, the readily available resources in their environment are no longer able to support it. What alters this relationship for human groups is that through agricultural technology we have been able to enhance the natural productivity of an environment, and through trade or warfare we have been able to move resources from areas of availability to areas of high demand. The actual population numbers in any particular community or for an entire society reflect a variety of biological and social factors that govern fertility, mortality, and migration. The archaeological and ethnographic records clearly demonstrate that although human populations are biologically capable of growing quite quickly, they equally are able to limit that growth through social and other mechanisms (Cowgill 1975). This produces a situation in which population growth is not seen as an unremitting pressure, but rather as a flexible variable responding to many factors by increasing, remaining stable, or even declining.

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The Anti-Politics Machine
"Development" and Bureaucratic Power in Lesotho

James Ferguson with Larry Lohmann

In the past two decades, Lesotho—a small landlocked nation of about 1.8 million people surrounded by South Africa, with a current Gross National Product (GNP) of US$816 million—has received "development" assistance from 26 different countries, ranging from Australia, Cyprus and Ireland to Switzerland and Taiwan. Seventy-two international agencies and non- and quasi-governmental organizations, including CARE, Ford Foundation, the African Development Bank, the European Economic Community, the Overseas Development Institute, the International Labour Organization and the United Nations Development Programme, have also been actively involved in promoting a range of "development" programmes. In 1979, the country received some $64 million in "official" development "assistance"—about $49 for every man, woman and child in the country. Expatriate consultants and "experts" swarm in the capital city of Maseru, churning out plans, programmes and, most of all, paper, at an astonishing rate.

As in most other countries, the history of "development" projects in Lesotho is one of "almost unremitting failure to achieve their objectives."[1] Nor does the country appear to be of especially great economic or strategic importance. What, then, is this massive and persistent internationalist intervention all about?

Constructing a "Developer's" Lesotho

To "move the money" they have been charged with spending, "development" agencies prefer to opt for standardized "development" packages. It thus suits the agencies to portray developing countries in terms that make them suitable targets for such packages. It is not surprising, therefore, that the "country profiles" on which the agencies base their interventions frequently bear little or no relation to economic and social realities.

In 1975, for example, the World Bank issued a report on Lesotho that was subsequently used to justify a series of major Bank loans to the country. One passage in

the report—describing conditions in Lesotho at the time of its independence from Britain in 1966—encapsulates an image of Lesotho that fits well with the institutional needs of "development" agencies:

> Virtually untouched by modern economic development … Lesotho was, and still is, basically, a traditional subsistence peasant society. But rapid population growth resulting in extreme pressure on the land, deteriorating soil and declining agricultural yields led to a situation in which the country was no longer able to produce enough food for its people. Many able-bodied men were forced from the land in search of means to support their families, but the only employment opportunities [were] in neighbouring South Africa. At present, an estimated 60 per cent of the male labour force is away as migrant workers in South Africa … At independence, there was no economic infrastructure to speak of. Industries were virtually non-existent.[2]

The Invention of "Isolation"

To a scholar of Lesotho, these assertions appear not only incorrect but outlandish. For one thing, the country has not been a "subsistence" society since at least the mid-1800s, having entered the twentieth century as a producer of "wheat, mealies, Kaffir corn [*sic*], wool, mohair, horses and cattle" for the South African market.[3] Nor were the local Basotho people isolated from the market. When they have had surpluses of crops or livestock, the people have always known how to go about selling them in local or regional markets. According to *The Oxford History of South Africa*:

> In 1837 the Sotho of Basutoland … had grain stored for four to eight years: in 1844 white farmers "flocked" to them to buy grain. During 1872 (after the loss of their most fertile land west of the Caledon) the Sotho exported 100,000 *muids* [185-lb bags] of grain … and in 1877 when the demand for grain on the diamond fields had fallen, "large quantities" were held by producers and shopkeepers in Basutoland.[4]

Livestock auctions, meanwhile, have been held throughout the country since at least the 1950s, and animals from central Lesotho have been sold by the Basotho as far afield as South Africa for as long as anyone can remember. Far from being "untouched" by modern "development" at the time of independence, colonial rule had established a modern administration, airports, roads, schools, hospitals and markets for Western commodities.

The decline in agricultural surpluses, moreover, is neither recent nor, as the Bank suggests, due to "isolation" from the cash economy. More significant is the loss by the Basotho of most of their best agricultural land to encroaching Dutch settlers during a series of wars between 1840 and 1869. Nor is migration a recent response of a pristine and static "traditional" economy to "population pressure." As H. Ashton, the most eminent Western ethnographer of the Basuto, noted in 1952, "labour migration is … nearly as old as the Basuto's contact with Europeans"[5]—indeed, throughout the colonial period to the present, Lesotho has served as a labour reservoir exporting wage workers to South African mines, farms and industry.

Lesotho Reality

In fact, far from being the "traditional subsistence peasant society" described by the Bank, Lesotho comprises today what one writer describes as "a rural proletariat which scratches about on the land."[6]

Whilst the World Bank claims that "agriculture provides a livelihood for 85 per cent of the people,"[7] the reality is that something in the order of 70 per cent of average rural household income is derived from wage labour in South Africa, while only six per cent comes from domestic crop production.[8] Similar myth-making pervades a joint FAO/World Bank report from 1975, which solemnly states that "about 70 per cent of [Lesotho's] GNP comes from the sale of pastoral products, mainly wool and mohair." A more conventional figure would be two or three per cent.[9]

Also false is the "development" literature's picture of Lesotho as a self-contained geographical entity whose relation with South Africa (its "rich neighbour") is one of accidental geographic juxtaposition rather than structural economic integration or political subordination, and whose poverty can be explained largely by the dearth of natural resources within its boundaries, together with the incompleteness with which they have been "developed." If the country is resource-poor, this is because most of the good Sotho land was taken by South Africa. Saying, as USAID does in a 1978 report, that "poverty in Lesotho is primarily resource-related" is like saying that the South Bronx of New York City is poor because of its lack of natural resources and the fact that it contains more people than its land base can support.

Rearranging Reality

A representation which acknowledged the extent of Lesotho's long-standing involvement in the "modern" capitalist economy of Southern Africa, however, would not provide a convincing justification for the "development" agencies to "introduce" roads, markets and credit. It would provide no grounds for believing that such "innovations" could bring about the "transformation" to a "developed," "modern" economy which would enable Lesotho's agricultural production to catch up with its burgeoning population and cut labour migration. Indeed, such a representation would tend to suggest that such measures for "opening up" the country and exposing it to the "cash economy" would have little impact, since Lesotho has not been isolated from the world economy for a very long time.

Acknowledging that Lesotho is a labour reserve for South African mining and industry rather than portraying it as an autonomous "national economy," moreover, would be to stress the importance of something which is inaccessible to a "development" planner in Lesotho. The World Bank mission to Lesotho is in no position to formulate programmes for changing or controlling the South African mining industry, and it has no disposition to involve itself in political challenges to the South African system of labour control. It is in an excellent position, however, to devise agricultural improvement projects, extension, credit and technical inputs, for the agriculture of Lesotho lies neatly within its jurisdiction, waiting to be "developed."

Taking the Politics out of "Development"

One striking feature of the "development" discourse on Lesotho is the way in which the "development" agencies present the country's economy and society as lying within the control of a neutral, unitary and effective national government, and thus almost perfectly responsive to the blueprints of planners. The state is seen as an impartial instrument for implementing plans and the government as a machine for providing social services and engineering growth.

Excluded from the Bank's analysis are the political character of the state and its class basis, the uses of official positions and state power by the bureaucratic elite and other individuals, cliques and factions, and the advantages to them of bureaucratic "inefficiency" and corruption. The state represents "the people," and mention of the undemocratic nature of the ruling government or of political opposition is studiously avoided. The state is taken to have no interests except "development": where "bureaucracy" is seen as a problem, it is not a political matter, but the unfortunate result of poor organization or lack of training.

Political parties almost never appear in the discourse of the Bank and other "development" institutions, and the explicitly political role played by "development" institutions such as Village Development Committees (VDCs), which often serve as channels for the ruling Basotho National Party (BNP), is ignored or concealed. "The people" tend to appear as an undifferentiated mass, a collection of "individual farmers" and "decision makers," a concept which reduces political and structural causes of poverty to the level of individual "values," "attitudes" and "motivation." In this perspective, structural change is simply a matter of "educating" people, or even just convincing them to change their minds. When a project is sent out to "develop the farmers" and finds that "the farmers" are not much interested in farming, and, in fact, do not even consider themselves to be "farmers," it is thus easy for it to arrive at the conclusion that "the people" are mistaken, that they really are farmers and that they need only to be convinced that this is so for it to be so.

In fact, neither state bureaucracies nor the "development" projects associated with them are impartial, apolitical machines which exist only to provide social services and promote economic growth. In the case of the Canadian- and World Bank–supported Thaba-Tseka Development Project, an agricultural programme in Lesotho's central mountains, Sesotho-language documents distributed to villagers were found to have slogans of the ruling Basotho National Party (BNP) added at the end, although these did not appear in any of the English language versions. Public village meetings conducted by project staff were peppered with political speeches, and often included addresses by a high-ranking police officer on the "security threat" posed by the opposition Basutoland Congress Party. Any money remaining after project costs had been repaid went to the BNP's Village Development Committees—leading one villager to note caustically, "It seems that politics is nowadays nicknamed 'development.'"

Inevitable Failure

Because the picture of Lesotho constructed by the Bank and other "development" agencies bears so little resemblance to reality, it is hardly surprising that most "development" projects have "failed" even on their own terms. Thus after years of accusing local people of being "defeatist" or "not serious" about agriculture, and even implying that wage increases at South African mines were "a threat" to the determination of farmers to become "serious," Thaba-Tseka project experts had to concede that local people were right that little beside maize for local consumption was going to come out of their tiny mountain fields, and that greater investment in agriculture was not going to pay handsome rewards.[10]

Casting themselves in the role of politically-neutral artisans using "development" projects as tools to grab hold of and transform a portion of the country according to a pre-determined plan, "development" officials assumed that the projects were givens and all they had to do was "implement" them.

In the case of the Thaba-Tseka project, for example, planners assumed that it would be a relatively simple matter to devolve much of the decision-making to a newly constituted Thaba-Tseka district, in order to increase efficiency, enable the project to be in closer touch with the needs of "the people" and avoid its becoming entangled in government bureaucracy. But what the planners assumed would be a simple technical reform led—predictably—to a whole range of actors using the reforms for their own ends.

The project's Health Division, for example, was partly appropriated as a political resource for the ruling National Party. Power struggles broke out over the use of project vehicles. Government ministries refused to vote funds to the project and persisted in maintaining their own control over their field staff and making unilateral decisions on actions in the district. An attempt to hire a Mosotho to replace the project's expatriate Canadian director was rejected, since as long as the programme's image remained "Canadian," there could be no danger of bringing about a real "decentralization" of power away from Maseru, Lesotho's capital.

Instead of being a tool used by artisans to resculpt society, in short, the project was itself worked on: it became like a bread crumb thrown into an ant's nest. Plans for decentralization were thus abandoned in 1982. Yet Thaba-Tseka's planners continued to insist that the project's failure resulted somehow from the government's failure to understand the plan, or from the right organizational chart not having been found. Needing to construe their role as "apolitical," they continued to see government as a machine for delivering services, not as a political fact or a means by which certain classes and interests attempted to control the behaviour and choices of others.

A Different Kind of Property

Another example of "failure" stemming from the "development" discourse's false construction of Lesotho is that of livestock "development."

"Development" planners have long seen Lesotho's grasslands as one of the few potentially exploitable natural resources the country possesses,[11] and the country's herds of domestic grazing animals as an inertia-ridden "traditional" sector ripe for transformation by the dynamic "modern" cash economy. What is required, according to planners, is to develop "appropriate marketing outlets," control grassland use to optimize commercial productivity through destocking and grazing associations, introduce improved breeds, and convince "farmers to market their non-productive stock."[12]

Far from being the result of "traditional" inertia, however, the Basotho's reluctance to treat livestock commercially is deeply embedded in, and partly maintained by, a modern, capitalist labour reserve economy. In Lesotho's highly-monetized economy, an item such as a transistor radio or a bar of soap may be subject to the same market mechanisms of pricing, supply and demand as it is anywhere else. Cattle, goats and sheep, however, are subject to very different sorts of rules. Although cash can always be converted into livestock through purchase, there is a reluctance to convert grazing animals to cash through sale, except when there is an emergency need for food, clothes, or school fees.

This practice is rooted in, and reinforced by, a social system in which young working men are away in South Africa supporting their families for ten or eleven months of the year. (Mines hire only men, and it is very difficult for women from Lesotho to find work in South Africa.) If a man comes home from the mines with cash in his pocket, his wife may present him with a demand to buy her a new dress, furniture for the house or new blankets for the children. If, on the other hand, he comes home with an ox purchased with his wages, it is more difficult to make such demands.

One reason that men like to own large numbers of livestock is that they boost their prestige and personal networks in the community, partly since they can be farmed out to friends and relatives to help with their field work. They thus serve as a "place-holder" for the man in the household and the community, symbolically asserting his structural presence and prestigious social position, even in the face of his physical absence. After he has returned to the household because of injury, age or being laid off from the South African mines to "scratch about on the land," livestock begin to be sold in response to absolute shortages of minimum basic necessities. Grazing animals thus constitute a sort of special "retirement fund" for men which is effective precisely because, although it lies within the household, it cannot be accessed in the way cash can.

However useful and necessary they may be, moreover, livestock in Lesotho is less an "industry" or a "sector" than a type (however special) of consumer good bought with wages earned in South Africa when times are good and sold off only when times are bad. The sale of an animal is not "off-take" of a surplus, but part of a process which culminates in the destruction of the herd. A drop in livestock exports from Lesotho is thus not, as the "development" discourse would have it, a sign of a depressed "industry," but of a rise in incomes. For instance, when wages were increased in South African mines in the 1970s, Basotho miners seized the opportunity to invest in cattle in unprecedented numbers, leading to a surge in import figures from 4,067 in 1973 to 57,787 in 1978. Over the same period, meanwhile, cattle export figures dropped

from 12,894 to 574. A boom in exports, on the other hand, would be the mark of a disaster.

Not surprisingly, attempts to "modernize" Lesotho's "livestock sector" have met with resistance. Within one year of the Thaba-Tseka project attempting to fence off 15 square kilometres of rangeland for the exclusive use of "progressive," "commercially-minded" farmers, for example, the fence had been cut or knocked down in many places, the gates stolen, and the area was being freely grazed by all. The office of the association manager had been burned down, and the Canadian officer in charge of the programme was said to be fearing for his life.

This resistance was rooted in more than a general suspicion of the government and the "development" project. To join the official "grazing association" permitted to use the fenced-in land, stock owners were required to sell off many poor animals to buy improved ones, ending up with perhaps half as many. Such sales and restrictions in herd size were not appealing for most Basotho men. Joining the association not only meant accepting selection, culling and marketing of herds. It also meant acquiescing in the enclosure of both common grazing land and (insofar as any Mosotho's livestock are also a social, shared domain of wealth) animals. It thus signified a betrayal of fellow stock-owners who remained outside the organization, an act considered anti-social. Prospective association members also probably feared that their animals—which represent wealth in a visible, exposed, and highly vulnerable form—might be stolen or vandalized in retaliation.

The Side Effects of "Failure"

Despite such disasters, it may be that what is most important about a "development" project is not so much what it fails to do but what it achieves through its "side effects." Rather than repeatedly asking the politically naive question "Can aid programmes ever be made really to help poor people?" perhaps we should investigate the more searching question, "What do aid programmes do *besides* fail to help poor people?"

Leftist political economists have often argued that the "réal" purpose of "development" projects is to aid capitalist penetration into Third World countries. In Lesotho, however, such projects do not characteristically succeed in introducing new relations of production (capitalist or otherwise), nor do they bring about modernization or significant economic transformations. Nor are they set up in such a way that they ever could. For this reason, it seems a mistake to interpret them *simply* as "part of the historical expansion of capitalism" or as elements in a global strategy for controlling or capitalizing peasant production.

Another look at the Thaba-Tseka project, reveals that, although the project "failed" both at poverty alleviation and at extending the influence of international capital, it did have a powerful and far-reaching impact on its region. While the project did not transform livestock-keeping, it did build a road to link Thaba-Tseka more strongly with the capital. While it did not bring about "decentralization" or "popular participation," it was instrumental in establishing a new district administration and giving the government a much stronger presence in the area than it had ever had before.

As a direct result of the construction of the project centre and the decision to make that centre the capital of a new district, there appeared a new post office, a police station, a prison and an immigration control office; there were health officials and nutrition officers and a new "food for work" administration run by the Ministry of Rural Development and the Ministry of Interior, which functioned politically to regulate the power of chiefs. The new district centre also provided a good base for the "Para-Military Unit," Lesotho's army, and near the project's end in 1983, substantial numbers of armed troops began to be garrisoned at Thaba-Tseka.

In this perspective, the "development" apparatus in Lesotho is not a machine for eliminating poverty that is incidentally involved with the state bureaucracy. Rather, it is a machine for reinforcing and expanding the exercise of bureaucratic state power, which incidentally takes "poverty" as its point of entry and justification—launching an intervention that may have no effect on the poverty but does have other concrete effects.

This does not mean that "the state," conceived as a unitary entity, "has" more power to extract surplus, implement programmes, or order around "the masses" more efficiently—indeed, the reverse may be true. It is, rather, that more power relations are referred through state channels and bureaucratic circuits—most immediately, that more people must stand in line and await rubber stamps to get what they want. "It is the same story over again," said one "development" worker. "When the Americans and the Danes and the Canadians leave, the villagers will continue their marginal farming practices and wait for the mine wages, knowing only that now the taxman lives down the valley rather than in Maseru."[13]

At the same time, a "development" project can effectively squash political challenges to the system not only through enhancing administrative power, but also by casting political questions of land, resources, jobs or wages as technical "problems" responsive to the technical "development" intervention. If the effects of a "development" project end up forming any kind of strategically coherent or intelligible whole, it is as a kind of "anti-politics" machine, which, on the model of the "anti-gravity" machine of science fiction stories, seems to suspend "politics" from even the most sensitive political operations at the flick of a switch.

Such a result may be no part of the planners' intentions. It is not necessarily the consequence of any kind of conspiracy to aid capitalist exploitation by incorporating new territories into the world system or working against radical social change, or bribing national elites, or mystifying the real international relationships. The result can be accomplished, as it were, behind the backs of the most sincere participants. It may just happen to be the way things work out.

What Is To Be Done? By Whom?

If, then, "development" cannot be the answer to poverty and powerlessness in Lesotho, what is? What is to be done, if it is not "development"?

Any question of the form "What is to be done?" demands first of all an answer to the question "By whom?" The "development" discourse, and a great deal of policy

science, tends to answer this question in a utopian way by saying "Given an all-powerful and benevolent policy-making apparatus, what should it do to advance the interests of its poor citizens?"

The question is often put in the form "What should *they* do?", with the "they" being not very helpfully specified as "Lesotho" or "the Basotho." When "developers" speak of such a collectivity what they mean is usually the government. But the government of Lesotho is not identical with the people who live in Lesotho, nor is it in any of the established senses "representative" of that collectivity. As in most countries, the government is a relatively small clique with narrow interests. There is little point in asking what such entrenched and often extractive elites should do in order to empower the poor. Their own structural position makes it clear that they would be the last ones to undertake such a project.

Perhaps the "they" in "What should they do?" means "the people." But again, the people are not an undifferentiated mass. There is not one question—What is to be done?—but hundreds: What should the mineworkers do? What should the abandoned old women do? and so on. It seems presumptuous to offer prescriptions here. Toiling miners and abandoned old women know the tactics proper to their situations far better than any expert does. If there is advice to be given about what "they" should do, it will not be dictating general political strategy or giving a general answer to the question "what is to be done?" (which can only be determined by those doing the resisting) but answering specific, localized, tactical questions.

What Should We Do?

If the question is, on the other hand, "What should *we* do?" it has to be specified, which "we"? If "we" means "development" agencies or governments of the West, the implied subject of the question falsely implies a collective project for bringing about the empowerment of the poor. Whatever good or ill may be accomplished by these agencies, nothing about their general mode of operation would justify a belief in such a collective "we" defined by a political programme of empowerment.

For some Westerners, there is, however, a more productive way of posing the question "What should we do?" That is, "What should we intellectuals working in or concerned about the Third World do?" To the extent that there are common political values and a real "we" group, this becomes a real question. The answer, however, is more difficult.

Should those with specialized knowledge provide advice to "development" agencies who seem hungry for it and ready to act on it? As I have tried to show, these agencies seek only the kind of advice they can take. One "developer" asked my advice on what his country could do "to help these people." When I suggested that his government might contemplate sanctions against apartheid, he replied, with predictable irritation, "No, no! I mean development!" The only advice accepted is about how to "do development" better. There is a ready ear for criticisms of "bad development projects," only so long as these are followed up with calls for "good development projects." Yet the agencies who plan and implement such projects—agencies like the World Bank,

USAID, and the government of Lesotho—are not really the sort of social actors that are very likely to advance the empowerment of the poor.

Such an obvious conclusion makes many uncomfortable. It seems to them to imply hopelessness; as if to suggest that the answer to the question "What is to be done?" is: "Nothing." Yet this conclusion does not follow. The state is not the only game in town, and the choice is not between "getting one's hands dirty by participating in or trying to reform development projects" and "living in an ivory tower." Change comes when, as Michel Foucault says, "critique has been played out in the real, not when reformers have realized their ideas."[14]

For Westerners, one of the most important forms of engagement is simply the political participation in one's own society that is appropriate to any citizen. This is, perhaps, particularly true for citizens of a country like the US, where one of the most important jobs for "experts" is combating imperialist policies.

NOTES

1. Murray, C., *Families Divided: The Impact of Migrant Labour in Lesotho*. Cambridge University Press, New York, 1981, p. 19.

2. World Bank, *Lesotho: A Development Challenge*, World Bank, Washington, DC, 1975, p. 1.

3. "Basutoland", *Encylopedia Britannica*, 1910.

4. Wilson, M. and Thompson, L., (eds.) *The Oxford History of South Africa*, Vol. 1., Oxford University Press, New York, 1969.

5. Ashton, H., *The Basuto: A Social Study of Traditional and Modern Lesotho*, Oxford University Press, New York, 1967 (second edition), p. 162.

6. Murray, C., op. cit. 1.

7. FAO/World Bank, *Draft Report of the Lesotho First Phase Mountain Area Development Project Preparation Mission*, Vols. I and II), FAO, Rome, 1975, Annex 1, p. 7.

8. van der Wiel, A.C.A., *Migratory Wage Labour: Its Role in the Economy of Lesotho*, Mazenod Book Centre, Mazenod, 1977.

9. FAO/World Bank, op. cit. 7, Annex 1, p. 7.

10. See "Appraisal of Project Progress During the Pilot Phase and Review of Plans to Expand Agricultural Programs in Phase II of Project Operations", CIDA, Ottawa, 1978, p. 39.

11. See, for example, FAO/World Bank, op. cit. 7, Annex 1, pp. 10–12. For a related South African history of government intervention into "traditional" livestock keeping, see Beinart, W. and Bundy, C., "State Intervention and Rural Resistance: The Transkei, 1900–1965", in Klein, M., (ed.) *Peasants in Africa*, Sage, Beverley Hills, 1981.

12. CIDA, op. cit. 10.

13. Quoted in Murphy, B., "Smothered in Kindness", *New Internationalist*, No. 82, 1979, p. 13.

14. Foucault, M., "Questions of Method: An Interview", *Ideology and Consciousness*, 8, 1981, p. 13.

Income Levels and the Environment

Wilfred Beckerman

Introduction

Nobody can deny that human activity had been imposing a strain on the environment even before the industrial revolution. The local environment was often severely damaged by over-grazing or destruction of tree cover in many parts of the world. But the scale of environmental damage was negligible compared with what followed from the expansion of the world population and the accompanying growth of economic activity.

Nevertheless this does not mean that rising income levels are inevitably and at all times and in all circumstances associated with a deterioration in the environment. For society has a capacity to react to events. For example, when the sanitary conditions in English cities became intolerable during the middle of the nineteenth century, pressures built up to do something about them and these pressures led to a substantial improvement over the subsequent decades. Or when, in the early 1950s, some British cities were afflicted with terrible smogs leading to the deaths of thousands of people (not to mention the closing down of a famous Opera House for a few days because the singers could only be seen in the front few rows!) public opinion forced the government to take effective action.

And during the last two decades most of the advanced economies in the world have implemented policies—some less effectively than others—to deal with their local pollution problems. There have even been successful conclusions, of international agreements to deal with certain forms of international pollution, such as oil 'spillages' at sea, or the phasing-out of emissions of the CFCs that are believed to damage the ozone layer.[1] It is all a matter of what policies are adopted, and the evidence suggests that increasing affluence is the best route to the adoption of policies that protect the environment.

This chapter will therefore begin with an attempt to put the environmental conditions experienced in advanced countries today into some sort of long-term historical perspective. This will be followed by a brief survey of the relationship between income levels and the three specific environmental media—clean drinking water,

sanitation and urban air quality—which, are among the most important components of human welfare in the 75 per cent of the world's population that live in developing countries. It will be shown that when we focus on these particular features of the environment it remains true that increasing economic prosperity is still the best route to an improvement in these components of human welfare.

The Environment in Historical Perspective

One of the reasons for the currently popular view that economic growth has been accompanied by a decline in welfare is the lack of historical perspective. It is true that in the absence of appropriate policies of environmental protection economic growth may bring with it environmental damage of one kind or another. People are very conscious, for example, of the noise from motorways or jet planes, or how beaches are fouled as a result of inadequate sewage discharges or oil spillages at sea, or of landscape blight caused by industrial development in one way or another, and so on. And no doubt tougher policies to protect the environment in all forms should be implemented. For reasons well known to economists, there is a presumption that, on the whole, the environment will be 'used up' more than is socially desirable, in the absence of special policies, so that there is no cause for complacency. Nevertheless few people realise how bad the environment was in the past in what are now advanced countries and how great an improvement in the environment has taken place.

For example, it is fashionable nowadays to complain about air pollution caused by automobiles in congested urban areas, such as in Central London or New York. But when Chateaubriand was taking up his post at the French Embassy in London in 1822 he wrote: 'At Blackheath, a common frequented by highwaymen, I found a newly built village. Soon I saw before me the immense skull-cap of smoke which covers the city of London. Plunging into the gulf of black mist, as if into one of the mouths of Tartarus, and crossing the whole town, whose streets I recognised, I arrived at the Embassy in Portland Place.'[2] A few decades later it was reported: 'The space bounded by Oxford Street, Portland Place, New Road, Tottenham Court Road, is one vast cesspool, the sewers being so imperfectly constructed that their contents are almost always stagnant … Now when the reader reflects that thousands of working men are closely confined, for perhaps 14 or 15 hours out of the 24, in a room in which the offensive effluvium of some cesspool is mingling with the atmosphere … he will cease to wonder at the amount of disease …'[3]

It is hardly surprising that deaths from typhus alone in England in the mid-nineteenth century were nearly 20,000 a year, and that 60,000 deaths a year were attributed to tuberculosis, not to mention high death-rates from numerous other diseases associated with unhealthy living conditions.[4] Nor were conditions in London by any means unique. Inquiries carried out by the Health of Towns Association into the sanitary conditions in the other main cities and towns produced a more or less uniform picture: 'Bolton—very bad indeed; Bristol—decidedly bad; the mortality is very great; Hull—some parts as bad as can be conceived; many districts very filthy; with a few exceptions, the town and coast drainage extremely bad; great overcrowding, and want of

ventilation generally.'[5] The only places today where such conditions can be found are in the poorer districts of many large cities in relatively low-income countries, such as Calcutta, Manila, Mexico City and Sao Paulo.

Income Levels and Environmental Quality Today

(a) The General Relationship

The main reason for expecting economic growth to be good for the environment, in the longer run, as well as bad for it in specific instances and particular time periods, hardly needs elaboration. It is the only possible interpretation of the evidence. A casual glance at the state of the environment in the principal towns and cities of the world shows that the environment that matters most to human beings—notably access to water and sanitation, housing, social infrastructure and absence of the more traditional types of air pollution such as SO_2 and smoke—is much better in the richer countries than in the poorer. And although the data are more fragmentary, the disparity between the environments in developed and developing countries is even greater in rural areas.

The reason is obvious. As people get richer their priorities change and the environment moves up in the hierarchy of human needs. When their basic needs for food, water, clothing and shelter are satisfied they can begin to attach importance to other ingredients in total welfare, including, eventually, the environment. As public perceptions and concerns move in the environmental direction, so communities will be more willing to allocate resources to this purpose. And this shift in expenditure priorities is easier insofar as richer countries will be more able to afford them.

For example, United States public and private expenditures on pollution abatement and control ('PAC') represent nearly 2 per cent of GNP, which is a higher share than for any other country for which comparative data are available. And the share is still rising.[6] These expenditures rose in the USA at an average annual rate of 3.2 per cent over the period 1972–1987, when total real GNP rose by 2.6 per cent.[7] The only other country for which comparable data are available for any length of time is Germany, where, too, total private and public PAC expenditures rose (at constant prices) at an annual average rate of 3.4 per cent during the period 1975–1985, raising the share of these expenditures in GNP from 1.37 per cent to 1.52 per cent.

These increases in expenditures have done more than just keep pace with the increasing burden that, in principle, higher levels of economic activity can impose on the environment. This is partly because the pattern of output in advanced countries has been changing in a direction that tends to impose less of a burden on the environment than was the case at earlier stages of their development. At higher levels of income industry accounts for a smaller share of GDP, whereas services—which are relatively non-polluting—account for an increasing share. Even within industry there has tended to be a shift away from the highly polluting heavy industries, such as metallurgy and heavy engineering, towards high-tech, high value-added industries employing large amounts of very skilled human capital and with smaller inputs of

energy or raw materials.[8] In addition, policies to combat pollution have of course been introduced mainly in richer countries, since they have the resources to implement their shift in priorities. As a result—as is shown in detail in the next three sections of this chapter—higher incomes are clearly associated with improvements in the environment as far as the most important traditional and ubiquitous pollutants are concerned (which are, of course, those for which there are comparable statistics).

(b) Water and Income Levels

Figure 16.1 shows the percentage of the population with access to safe drinking water in countries with different income levels in 1975 and 1985.[9] Countries have been ranked in order of their incomes per head, and those containing the 20 per cent of the population with the lowest income per head have been put at the left, with successive groups to the right representing countries with higher incomes per head. The average income in each group is shown at the top of the column for each group. The height of the column represents the percentage of the population that had access to safe drinking water.

As can be seen, in 1975 the bottom 20 per cent of the world's population had an average income of $206. Only about a fifth of them had access to safe drinking water. At the other end of the scale, among the top 20 per cent of the population, who had an average income of $2,381 per annum in 1975, almost 80 per cent had access to safe

FIGURE 16.1

Income levels and access to safe drinking water: a cross-country comparison, 1975 and 1985

World population in five equal groups ranked by average income
(shown above each column)

▨ 1975   ⦂⦂ 1985
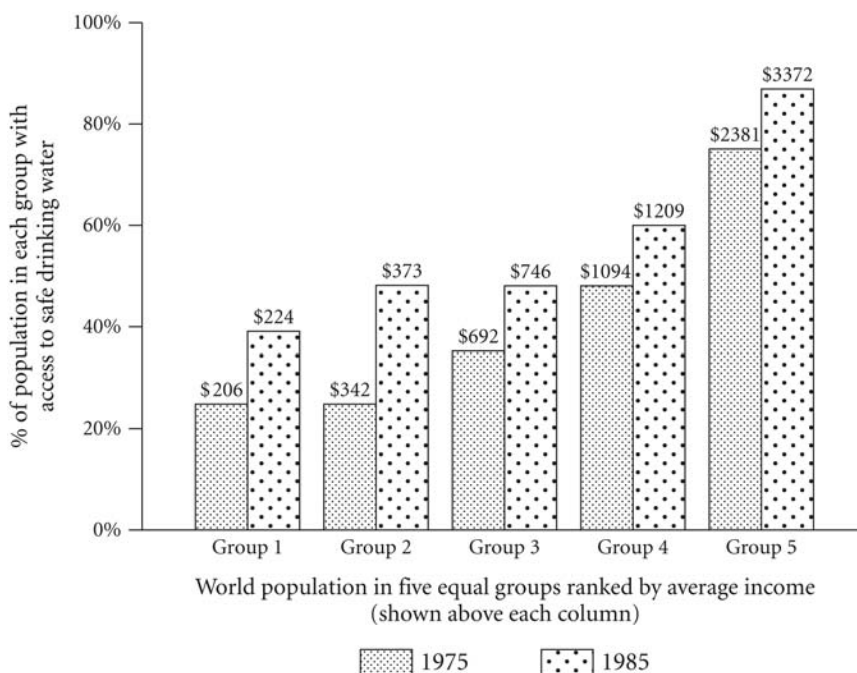
SOURCE: W. Beckerman, *Economic Development and the Environment*

drinking water. In short, as we should expect, higher incomes tend to be associated with a higher proportion of the population having access to safe drinking water. There has also been some progress in almost all countries over the period 1975–1985, in spite of the rapid growth of the population of most developing countries during this period. The relationship between income levels and access to safe drinking water is unambiguous. If you want to increase the proportion of the population with access to clean drinking water, get richer.

Although satisfactory sewerage and sanitation arrangements are more difficult to define and hence to represent in a simple number, *Figure 16.2* also confirms what we should expect, namely that an increase in incomes is the best way of increasing access to the sanitation facilities that most people in advanced countries would take for granted as normal attributes of a minimum standard of living. Of course in many countries the pace of urbanisation has meant that sanitation and waste disposal arrangements have been totally unable to cope with the additional demands and bring the services up to the levels normally associated with even medium-income-level countries. For example, even in Thailand, where the growth of prosperity has been remarkably sustained, it is estimated that in Bangkok only 2 per cent of the population is connected to sewers.

In the longer run, when incomes approach the levels enjoyed currently by advanced countries, we must assume that similar degrees of access to sanitation will be

FIGURE 16.2
Income levels and sanitation, rural and urban: a cross-country comparison, 1985
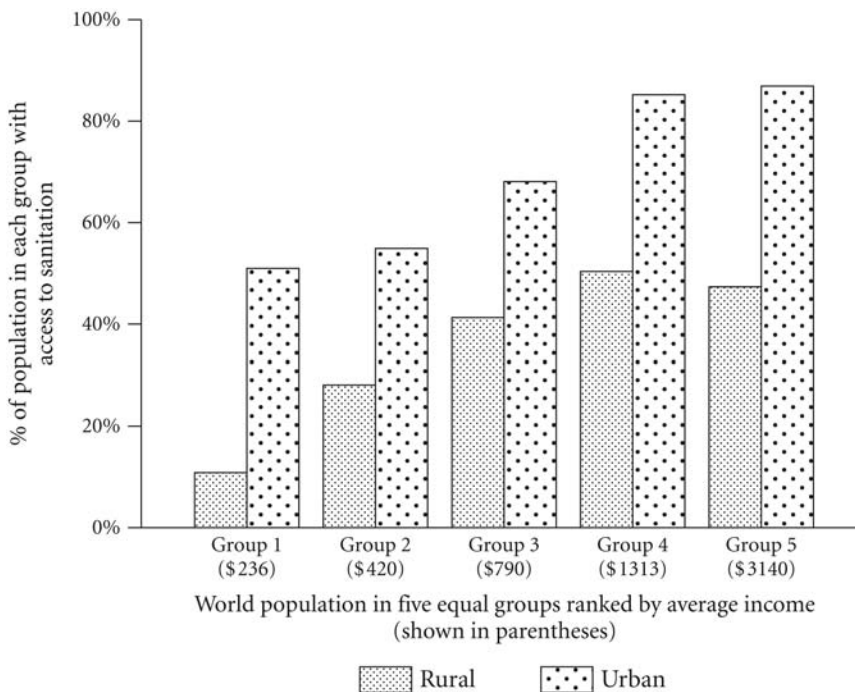
SOURCE: W. Beckerman, *Economic Development and the Environment*

achieved. But very rapid urbanisation poses special problems, even if average incomes are rising, so that in the short-to-medium run the conflict between economic growth and the environment can be more pronounced.

(c) Air Pollution and Income Levels

(i) Sulphur Dioxide (SO$_2$). Sulphur dioxide is one of the most widespread forms of air pollution known in the industrialised world. By combining with water vapour in the atmosphere it is believed to be largely responsible for a whole range of harmful effects, ranging from health effects and local damage to paintwork, metals and so on to acid rain and suspected damage to forests. But in advanced countries the reduction in SO$_2$ has been one of the major success stories in environmental control.[10] In Britain, for example, total SO$_2$ emissions fell by 25 per cent during the 1970s, and by 40 per cent relative to GNP. Similar results have been obtained in almost all other advanced countries, with corresponding improvements in the concentrations of SO$_2$ in the atmosphere.

Indeed if the major cities of the world are put into three groups according to the income levels of the countries in which they are located—low-income, medium-income and high-income—we find a clear change over the last decade or so in the way their income levels are related to their concentrations of SO$_2$. Around the late 1970s the SO$_2$ levels were higher in the higher-income countries, reflecting their greater degree of industrialisation. But about ten years later the position had been reversed. This corresponded to a decline in SO$_2$ concentrations of about 8.9 per cent per annum in the high-income countries and a rise of about 3.7 per cent in the low-income countries. Taking all the 33 cities covered in the data on SO$_2$ ambient air quality produced by the UN Global Environmental Monitoring Service ('GEMS') '27 have downward (at least 3 per cent per year) or stationary trends and 6 have upward trends (at least 3 per cent per year) with most improvements noted in cities of developed countries'.[11]

(ii) SPM or Smoke. A similar story is found in the trends of 'suspended particulate matter' (SPM) and smoke. Of the 37 cities covered in the GEMS data, the concentrations of SPMs and smoke in the air were following downward trends in 19, were more or less stationary in 12 and showed upward trends in only 6. But it is in the richer countries that SPM concentrations have fallen.[12] And, for those cities for which adequate data are available it is also clear that cities in low-income countries had ambient concentrations of SPM or smoke that were much higher than in the richer countries. Furthermore, measured by the number of days on which the World Health Office guidelines for SPM or smoke were exceeded during the course of the year, the preponderance of cities in developing countries is overwhelming.[13]

(iii) NO$_x$ and CO The picture is slightly more confused when we turn to two other pollutants, carbon monoxide (CO) and nitrous oxides (NO$_x$s), since emissions of these, particularly CO, are heavily influenced by the automobile—both the number of automobiles and the speeds at which they are able to circulate.[14] Furthermore, the limitations on inter-city comparability of measures of these pollutants are particularly

severe. Hence, in terms of ambient air concentrations of, say, NO_xs, 'cities of the developing and developed countries are found at both ends of the concentration range … some of the lowest NO_2 values are reported from the two Indian cities Bombay and New Delhi, presumably because traffic levels are relatively low.'[15]

Nevertheless some overall difference can be observed between cities in poor and rich countries. For example, although there are some exceptions—notably London, Frankfurt and Amsterdam—trends in ambient NO_2 concentrations in most other cities in developed countries are now stable or declining, in spite of sustained increases in automobile numbers. By contrast, the trends are generally rising in cities in developing countries.[16] The picture is roughly the same for CO ambient concentrations. Data are only available for cities in eleven countries, and CO concentrations are declining in all of them. With one exception—Santiago—the cities are all in high-income countries. By contrast, fragmentary data for a few individual cities in developing countries confirm the rise in concentrations of these pollutants.

(iv) Lead Another highly publicised pollutant is lead in gasoline. In recent years almost all industrialised countries have taken effective measures of one kind or another to reduce lead emissions from automobiles, often with striking results. For example, the total quantity of lead used in gasoline in the USA was cut from 170,000 tons in 1975 to 40,000 tons in 1984, and Japan has made even greater progress. By contrast: 'Few developing countries have yet made significant reductions in petrol lead content …'[17]

In general therefore, although we cannot say precisely how overall 'air quality' should be defined, or at exactly what level further increases in incomes lead to improvements in air quality, it is fairly clear that it does so sooner or later. How much sooner or later—i.e. at what point in time or level of income—urban air conditions reach a state when effective policies are introduced will depend on a host of variables, including technical, social and political variables. It is not surprising, therefore, that the record of individual countries shows a reversal in the trend in the traditional pollutants (SO_2 and SPM or smoke) at very different stages in their history.

The Role of Policy

This last point illustrates the role of policy in shaping the precise relationship between economic growth and environmental pollution. In the longer run higher incomes are clearly associated with improved environments, but the transition period may be a long and painful one, during which the environment can seriously deteriorate. How long and painful is the transition period depends largely on the policies pursued by governments, but partly on other variables. Changes in the pattern of output, or in the technical relationships between specific economic activities and their environmental impacts, have played a major part. But changes in social structures, political pressures, public awareness and, above all, the resulting policies adopted by the authorities have also been important.

However, policies do not emerge in a vacuum independently of accompanying economic and social conditions. The former are often very dependent on the latter.

The stringent air pollution controls would probably not have been introduced in Britain in the 1950s, even after the notorious 'killer' smog of 1952 in London, had not other factors led to a shift to more efficient forms of heating in many homes and to the virtual disappearance of cheap domestic service.[18] In the same way, the absence of democracy in the Soviet bloc was no doubt largely responsible for the failure of the authorities to worry much about the environment. What mattered was the achievement of the planned production targets. The welfare of the citizens was of minor importance.

At the same time, the above data show that a country's environmental priorities depend largely on its income level. In the past, when income levels were much lower than they are today, developing countries did not worry much about pollution. In the early 1970s, for example, countries such as Brazil and Algeria were in the forefront of the opposition to the then newly emerging shift of emphasis—in the richer countries—away from economic growth in favour of more care for its environmental effects. At the World Environment Conference in Stockholm in 1972 Brazil made it clear that it intended to continue to industrialise without concern for environmental problems. But conditions in cities such as Sao Paulo were already becoming almost intolerable, and within a few years there was a major shift in policy in the direction of environmental protection.[19] By the mid-1980s, even though industrial production and vehicle numbers were still rising in the Sao Paulo area, the main air pollutants were falling.[20]

Air pollution from road transport provides a striking example of the way policies determine the incidence of any particular form of pollution. The severity of this problem in the fast-growing cities of developing countries has been mentioned already. By contrast, the largest reductions in automotive pollutants have been achieved in Japan, Germany and the USA as a result of their relatively early introduction of stringent controls on motor vehicles. There has been a move in this direction in most Western European countries, although in some cases the policies adopted so far seem to have been offset by increases in the number of vehicles.[21] Similar regulatory measures have also been introduced recently in some developing countries, but so far, with one or two exceptions, not with much effect, and, as discussed earlier, this is largely the result of their generally lower ability to afford, or monitor, the required policy changes.[22]

NOTES

1. An excellent up-to-date survey of some of the reasons for doubting the widespread acceptance of the need to reduce the use of CFCs in order to protect the ozone layer is provided in Singer, F., 1994.

2. *Memoirs of Chateaubriand*, p. 141.

3. The Metropolitan Working Classes' Association for Improving the Public Health, 1847, pp. 6–7.

4. See Gavin, H., 1847, p. 33. See also Holland, E.C., 1843, and Hammond, J.L., 1917, ch. 3.

5. Health of Towns Association, 1848, p. 7.

6. OECD, 1990, table 2, p. 40.

7. Farber, K.D. and Rutledge, G., 1989, pp. 19–23.

8. Gordon Hughes argues (1990, p. ii), that insofar as Eastern European economies develop along the lines of the currently advanced Western economies their pollution intensities, and possibly levels, will decline precisely on account of this shift in economic structure that seems to characterise economic growth in almost all countries of the world.

9. For various reasons figures for individual countries are not strictly comparable, so that a more reasonable picture of the income/water supply relationship is provided by grouping countries into broad income bands. Country income levels are at constant (1987) $US. For details of individual countries and sources and definitions, see Beckerman, W., 1992.

10. See, for example, OECD, 1991, figure 9, 'Trends in man-made sulphur oxide emissions', p. 37.

11. UNEP/WHO GEMS, 1988, p. 15.

12. See details and sources in Beckerman, W., 1992, table 3.4.

13. The six worst cities, taking the average of 1980–84, in the GEMS ranking, were Teheran, Shenyang, Calcutta, Beijing, Xian and New Delhi, with Bombay, Kuala Lumpur and Bangkok not far behind. In these cities SPM and smoke levels exceeded the WHO guideline for the 98th percentile (i.e. the exposure level that should not be exceeded more than 2 per cent of the time, or 7 days a year) for anything between 200 days and 300 days per year (UNEP/WHO GEMS, 1988, figure 4.9, p. 33).

14. Up to a point the emission of pollutants from an automobile falls off rapidly as its speed increases, so that a major cause of urban air pollution from automobiles is traffic congestion. See Faiz, A. et al., 1990, tables 19, 20, and 21, pp. 42, 43, and 46.

15. UNEP/WHO GEMS, 1988, p. 44.

16. Ibid., p. 43. Even here, however, there are notable exceptions, namely Singapore.

17. UNEP/WHO GEMS, 1988, p. 60.

18. Ashby, E. and Anderson, M., 1981, p. 116, and Brimblecombe, P., 1987, p. 170.

19. See World Bank, 1990, p. 35 et seq.

20. Ibid., figure IV-1, p. 79.

21. UNEP/WHO GEMS, 1988, pp. 38–57.

22. For example, in Bangkok tighter standards on emissions were introduced as far back as 1979, but it has proved impossible fully to monitor and hence enforce these standards in a city in which the number of vehicles has grown rapidly to its present level of well over 2 million. Tighter restrictions were introduced in subsequent years and further reductions in permitted lead and sulphur levels are to be introduced in 1992 and 1993, but given the extra expenditures that this will require by the petroleum refining and distribution industries, together with the increased monitoring burden, it is far from certain that the newer standards will be fully implemented. (See internal World Bank memo by Christopher Redfern on 'Thailand: Environment', May 9th 1991.)

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Staying Alive
Women, Ecology, and Development

Vandana Shiva

Development, Ecology and Women

Development as a New Project of Western Patriarchy

'Development' was to have been a post-colonial project, a choice for accepting a model of progress in which the entire world remade itself on the model of the colonising modern west, without having to undergo the subjugation and exploitation that colonialism entailed. The assumption was that western style progress was possible for all. Development, as the improved well-being of all, was thus equated with the westernisation of economic categories—of needs, of productivity, of growth. Concepts and categories about economic development and natural resource utilisation that had emerged in the specific context of industrialisation and capitalist growth in a centre of colonial power, were raised to the level of universal assumptions and applicability in the entirely different context of basic needs satisfaction for the people of the newly independent Third World countries. Yet, as Rosa Luxemberg has pointed out, early industrial development in western Europe necessitated the permanent occupation of the colonies by the colonial powers and the destruction of the local 'natural economy'.[1] According to her, colonialism is a constant necessary condition for capitalist growth: without colonies, capital accumulation would grind to a halt. 'Development' as capital accumulation and the commercialisation of the economy for the generation of 'surplus' and profits thus involved the reproduction not merely of a particular form of creation of wealth, but also of the associated creation of poverty and dispossession. A replication of economic development based on commercialisation of resource use for commodity production in the newly independent countries created the internal colonies.[2] Development was thus reduced to a continuation of the process of colonisation; it became an extension of the project of wealth creation in modern western patriarchy's economic vision, which was based on the exploitation or exclusion of women (of the west and non-west), on the exploitation and degradation of nature, and on the exploitation and erosion of other cultures. 'Development' could

not but entail destruction for women, nature and subjugated cultures, which is why, throughout the Third World, women, peasants and tribals are struggling for liberation from 'development' just as they earlier struggled for liberation from colonialism.

The UN Decade for Women was based on the assumption that the improvement of women's economic position would automatically flow from an expansion and diffusion of the development process. Yet, by the end of the Decade, it was becoming clear that development itself was the problem. Insufficient and inadequate 'participation' in 'development' was not the cause for women's increasing under-development; it was rather, their enforced but asymmetric participation in it, by which they bore the costs but were excluded from the benefits, that was responsible. Development exclusivity and dispossession aggravated and deepened the colonial processes of ecological degradation and the loss of political control over nature's sustenance base. Economic growth was a new colonialism, draining resources away from those who needed them most. The discontinuity lay in the fact that it was now new national elites, not colonial powers, that masterminded the exploitation on grounds of 'national interest' and growing GNPS, and it was accomplished with more powerful technologies of appropriation and destruction.

Ester Boserup[3] has documented how women's impoverishment increased during colonial rule; those rulers who had spent a few centuries in subjugating and crippling their own women into de-skilled, de-intellectualised appendages, disfavoured the women of the colonies on matters of access to land, technology and employment. The economic and political processes of colonial under-development bore the clear mark of modern western patriarchy, and while large numbers of women and men were impoverished by these processes, women tended to lose more. The privatisation of land for revenue generation displaced women more critically, eroding their traditional land use rights. The expansion of cash crops undermined food production, and women were often left with meagre resources to feed and care for children, the aged and the infirm, when men migrated or were conscripted into forced labour by the colonisers. As a collective document by women activists, organisers and researchers stated at the end of the UN Decade for Women, 'The almost uniform conclusion of the Decade's research is that with a few exceptions, women's relative access to economic resources, incomes and employment has worsened, their burden of work has increased, and their relative and even absolute health, nutritional and educational status has declined.'[4]

The displacement of women from productive activity by the expansion of development was rooted largely in the manner in which development projects appropriated or destroyed the natural resource base for the production of sustenance and survival. It destroyed women's productivity both by removing land, water and forests from their management and control, as well as through the ecological destruction of soil, water and vegetation systems so that nature's productivity and renewability were impaired. While gender subordination and patriarchy are the oldest of oppressions, they have taken on new and more violent forms through the project of development. Patriarchal categories which understand destruction as 'production' and regeneration of life as 'passivity' have generated a crisis of survival. Passivity, as an assumed category of the 'nature' of nature and of women, denies the activity of nature and life. Fragmentation and uniformity as assumed categories of progress and development

destroy the living forces which arise from relationships within the 'web of life' and the diversity in the elements and patterns of these relationships.

The economic biases and values against nature, women and indigenous peoples are captured in this typical analysis of the 'unproductiveness' of traditional natural societies:

> Production is achieved through human and animal, rather than mechanical, power. Most agriculture is unproductive; human or animal manure may be used but chemical fertilisers and pesticides are unknown…. For the masses, these conditions mean poverty.[5]

The assumptions are evident: nature is unproductive; organic agriculture based on nature's cycles of renewability spells poverty; women and tribal and peasant societies embedded in nature are similarly unproductive, not because it has been demonstrated that in cooperation they produce *fewer* goods and services for needs, but because it is assumed that 'production' takes place only when mediated by technologies for commodity production, even when such technologies destroy life. A stable and clean river is not a productive resource in this view: it needs to be 'developed' with dams in order to become so. Women, sharing the river as a commons to satisfy the water needs of their families and society are not involved in productive labour: when substituted by the engineering man, water management and water use become productive activities. Natural forests remain unproductive till they are developed into monoculture plantations of commercial species. Development thus, is equivalent to maldevelopment, a development bereft of the feminine, the conservation, the ecological principle. The neglect of nature's work in renewing herself, and women's work in producing sustenance in the form of basic, vital needs is an essential part of the paradigm of maldevelopment, which sees all work that does not produce profits and capital as non- or unproductive work. As Maria Mies[6] has pointed out, this concept of surplus has a patriarchal bias because, from the point of view of nature and women, it is not based on material surplus produced *over and above* the requirements of the community: it is stolen and appropriated through violent modes from nature (who needs a share of her produce to reproduce herself) and from women (who need a share of nature's produce to produce sustenance and ensure survival).

From the perspective of Third World women, productivity is a measure of producing life and sustenance; that this kind of productivity has been rendered invisible does not reduce its centrality to survival—it merely reflects the domination of modern patriarchal economic categories which see only profits, not life.

Maldevelopment as the Death of the Feminine Principle

In this analysis, maldevelopment becomes a new source of male-female inequality. 'Modernisation' has been associated with the introduction of new forms of dominance. Alice Schlegel[7] has shown that under conditions of subsistence, the interdependence and complementarity of the separate male and female domains of work is the characteristic mode, based on diversity, not inequality. Maldevelopment militates against this equality in diversity, and superimposes the ideologically constructed category of western technological man as a uniform measure of the worth of classes,

cultures and genders. Dominant modes of perception based on reductionism, duality and linearity are unable to cope with equality in diversity, with forms and activities that are significant and valid, even though different. The reductionist mind super-imposes the roles and forms of power of western male-oriented concepts on women, all non-western peoples and even on nature, rendering all three 'deficient', and in need of 'development'. Diversity, and unity and harmony in diversity, become epistemo-logically unattainable in the context of maldevelopment, which then becomes syn-onymous with women's underdevelopment (increasing sexist domination), and nature's depletion (deepening ecological crises). Commodities have grown, but nature has shrunk. The poverty crisis of the South arises from the growing scarcity of water, food, fodder and fuel, associated with increasing maldevelopment and ecological destruction. This poverty crisis touches women most severely, first because they are the poorest among the poor, and then because, with nature, they are the primary sus-tainers of society.

Maldevelopment is the violation of the integrity of organic, interconnected and interdependent systems, that sets in motion a process of exploitation, inequality, in-justice and violence. It is blind to the fact that a recognition of nature's harmony and action to maintain it are preconditions for distributive justice. This is why Mahatma Gandhi said, 'There is enough in the world for everyone's need, but not for some people's greed.'

Maldevelopment is maldevelopment in thought and action. In practice, this frag-mented, reductionist, dualist perspective violates the integrity and harmony of man in nature, and the harmony between men and women. It ruptures the co-operative unity of masculine and feminine, and places man, shorn of the feminine principle, above nature and women, and separated from both. The violence to nature as symptoma-tised by the ecological crisis, and the violence to women, as symptomatised by their subjugation and exploitation arise from this subjugation of the feminine principle. I want to argue that what is currently called development is essentially maldevelop-ment, based on the introduction or accentuation of the domination of man over nature and women. In it, both are viewed as the 'other', the passive non-self. Activity, productivity, creativity which were associated with the feminine principle are expro-priated as qualities of nature and women, and transformed into the exclusive qualities of man. Nature and women are turned into passive objects, to be used and exploited for the uncontrolled and uncontrollable desires of alienated man. From being the cre-ators and sustainers of life, nature and women are reduced to being 'resources' in the fragmented, anti-life model of maldevelopment.

The Violence of Reductionism

The myth that the 'scientific revolution' was a universal process of intellectual pro-gress is being steadily undermined by feminist scholarship and the histories of science of non-western cultures. These are relating the rise of the reductionist paradigm with the subjugation and destruction of women's knowledge in the west, and the know-ledge of non-western cultures. The witch-hunts of Europe were largely a process of delegitimising and destroying the expertise of European women. In 1511, England had

an Act of Parliament directed against 'common artificers, as smythes, weavers and women who attempt great cures and things of great difficulties: in the witch they partly use sorcerye and witch-craft'.[8] By the sixteenth century women in Europe were totally excluded from the practice of medicine and healing because 'wise women' ran the risk of being declared witches. A deeper, more violent form of exclusion of women's knowledge and expertise, and of the knowledge of tribal and peasant cultures is now under way with the spread of the masculinist paradigm of science through 'development'.

I characterise modern western patriarchy's special epistemological tradition of the 'scientific revolution' as 'reductionist' because it reduced the capacity of humans to know nature both by excluding other knowers and other ways of knowing, and it reduced the capacity of nature to creatively regenerate and renew itself by manipulating it as inert and fragmented matter. Reductionism has a set of distinctive characteristics which demarcates it from all other non-reductionist knowledge systems which it has subjugated and replaced. The basic ontological and epistemological assumptions of reductionism are based on homogeneity. It sees all systems as made up of the same basic constituents, discrete, unrelated and atomistic, and it assumes that all basic processes are mechanical. The mechanistic metaphors of reductionism have socially reconstituted nature and society. In contrast to the organic metaphors, in which concepts of order and power were based on interconnectedness and reciprocity, the metaphor of nature as a machine was based on the assumption of separability and manipulability. This domination is inherently violent, understood here as the violation of integrity. Reductionist science is a source of violence against nature and women because it subjugates and dispossesses them of their full productivity, power and potential. The epistemological assumptions of reductionism are related to its ontological assumptions: uniformity allows the knowledge of parts of a system to be taken as knowledge of the whole. Separability allows context-free abstraction of knowledge and creates criteria of validity based on alienation and non-participation, then projected as 'objectivity'. 'Experts' and 'specialists' are thus projected as the only legitimate knowledge seekers and justifiers.

Profits, Reductionism and Violence

The close nexus between reductionist science, patriarchy, violence and profits is explicit in 80 per cent of scientific research that is devoted to the war industry, and is frankly aimed directly at lethal violence—violence, in modern times, not only against the enemy fighting force but also against the much larger civilian population. I argue that modern science is related to violence and profits even in peaceful domains such as, for example, forestry and agriculture, where the professed objective of scientific research is human welfare. The relationship between reductionism, violence and profits is built into the genesis of masculinist science, for its reductionist nature is an epistemic response to an economic organisation based on uncontrolled exploitation of nature for maximization of profits and capital accumulation.

Reductionism, far from being an epistemological accident, is a response to the needs of a particular form of economic and political organisation.[9] The reductionist

world-view, the industrial revolution and the capitalist economy were the philosoph-
ical, technological and economic components of the same process. Individual firms
and the fragmented sector of the economy, whether privately owned or state owned,
have only their own efficiency and profits in mind; and every firm and sector meas-
ures its efficiency by the extent to which it maximizes its gains, regardless of the max-
imization of social and ecological costs. The logic of this internal efficiency has been
provided by reductionism. Only those properties of a resource system are taken into
account which generate profits through exploitation and extraction; properties which
stabilise ecological processes but are commercially non-exploitative are ignored and
eventually destroyed.

Commercial capitalism is based on specialised commodity production. Uniformity
in production, and the uni-functional use of natural resources is therefore required.
Reductionism thus reduces complex ecosystems to a single component, and a single
component to a single function. It further allows the manipulation of the ecosystem
in a manner that maximizes the single-function, single-component exploitation. In
the reductionist paradigm, a forest is reduced to commercial wood, and wood is
reduced to cellulose fibre for the pulp and paper industry. Forests, land and genetic
resources are then manipulated to increase the production of pulpwood, and this dis-
tortion is legitimised scientifically as overall productivity increase, even though it
might decrease the output of water from the forest, or reduce the diversity of life
forms that constitute a forest community. The living and diverse ecosystem is thus
violated and destroyed by 'scientific' forestry and forestry 'development'. In this way,
reductionist science is at the root of the growing ecological crisis, because it entails a
transformation of nature such that its organic processes and regularities and regener-
ative capacities are destroyed.

Women in sustenance economies, producing and reproducing wealth in partner-
ship with nature, have been experts in their own right of a holistic and ecological
knowledge of nature's processes. But these alternative modes of knowing, which are
oriented to social benefits and sustenance needs, are not recognised by the reduction-
ist paradigm, because it fails to perceive the interconnectedness of nature, or the con-
nection of women's lives, work and knowledge with the creation of wealth.

The rationality and efficacy of reductionist and non-reductionist knowledge sys-
tems are never *evaluated* cognitively. The rationality of reductionist science is, a pri-
ori, declared superior. If reductionist science has displaced non-reductionist modes of
knowing, it has done so not through cognitive competition, but through political sup-
port from the state: development policies and programmes provide the financial and
material subsidies *as well as* the ideological support for the appropriation of nature
for profits. Since the twin myths of progress (material prosperity) and superior ration-
ality lost their sheen in the working out of development patterns and paradigms, and
were visibly exploded by widespread ecological crises, the state stepped in to trans-
form the myths into an ideology. When an individual firm or sector directly confronts
the larger society in its appropriation of nature on grounds of progress and rational-
ity, people can assess social costs and private benefits for themselves; they can differ-
entiate between progress and regression, rationality and irrationality. But with the
mediation of the state, subjects and citizens become objects of change rather than its

determinants, and consequently lose both the capability and the right to assess progress. If they have to bear the costs instead of reaping the benefits of 'development', this is justified as a minor sacrifice for the 'national interest'.

The nexus between the state, the dominant elite and the creation of surplus value provides the power with which reductionism establishes its supremacy. Institutions of learning in agriculture, medicine and forestry, selectively train people in the reductionist paradigms, in the name of 'scientific' agriculture, medicine and forestry to establish the superiority of reductionist science. Stripped of the power the state invests it with, reductionism can be seen to be cognitively weak and ineffective in responding to problems posed by nature. Reductionist forestry has destroyed tropical forests, and reductionist agriculture is destroying tropical farming. As a system of knowledge about nature or life reductionist science is weak and inadequate; as a system of knowledge for the market, it is powerful and profitable. Modern science, as we have noted earlier, has a world-view that both supports and is supported by the socio-political-economic system of western capitalist patriarchy which dominates and exploits nature, women and the poor.

The ultimate reductionism is achieved when nature is linked with a view of economic activity in which money is the only gauge of value and wealth. Life disappears as an organising principle of economic affairs. But the problem with money is that it has an asymmetric relationship to life and living processes. Exploitation, manipulation and destruction of the life in nature can be a source of money and profits but neither can ever become a source of nature's life and its life-supporting capacity. It is this asymmetry that accounts for a deepening of the ecological crises as a decrease in nature's life-producing potential, along with an increase of capital accumulation and the expansion of 'development' as a process of replacing the currency of life and sustenance with the currency of cash and profits. The 'development' of Africa by western experts is the primary cause for the destruction of Africa; the 'development' of Brazil by transnational banks and corporations is the primary cause for the destruction of the richness of Amazonian rainforests, the highest expression of life. Natives of Africa and Amazonia had survived over centuries with their ecologically evolved, indigenous knowledge systems. What local people had conserved through history, western experts and knowledge destroyed in a few decades, a few years even.

It is this destruction of ecologies and knowledge systems that I characterise as the violence of reductionism which results in: *a) Violence against women:* women, tribals, peasants as the knowing subject are violated socially through the expert/non-expert divide which converts them into non-knowers even in those areas of living in which through daily participation, they are the real experts—and in which responsibility of practice and action rests with them, such as in forestry, food and water systems. *b) Violence against nature:* nature as the object of knowledge is violated when modern science destroys its integrity of nature, both in the process of perception as well as manipulation. *c) Violence against the beneficiaries of knowledge:* contrary to the claim of modern science that people in general are ultimately the beneficiaries of scientific knowledge, they—particularly the poor and women—are its worst victims, deprived of their productive potential, livelihoods and life-support systems. Violence against nature recoils on man, the supposed beneficiary. *d) Violence against knowledge:* in

order to assume the status of being the only legitimate mode of knowledge, rationally superior to alternative modes of knowing, reductionist science resorts *to the suppression and falsification of facts* and thus commits violence against science itself. It declares organic systems of knowledge irrational, and rejects the belief systems of others without full rational evaluation. At the same time it protects itself from the exposure and investigation of the myths it has created by assigning itself a new sacredness that forbids any questioning of the claims of science.

NOTES

1. Rosa Luxemberg, *The Accumulation of Capital*, London: Routledge and Kegan Paul, 1951.

2. An elaboration of how 'development' transfers resources from the poor to the well-endowed is contained in J. Bandyopadhyay and V. Shiva, 'Political Economy of Technological Polarisations' in *Economic and Political Weekly*, Vol. XVIII, 1982, pp. 1827–32; and J. Bandyopadhyay and V. Shiva, 'Political Economy of Ecology Movements', in *Economic and Political Weekly*, forthcoming.

3. Ester Boserup, *Women's Role in Economic Development*, London: Allen and Unwin, 1970.

4. Development Alternatives with Women for a New Era (DAWN), *Development Crisis and Alternative Visions: Third World Women's Perspectives*, Bergen: Christian Michelsen Institute, 1985, p. 21.

5. M. George Foster, *Traditional Societies and Technological Change*, Delhi: Allied Publishers, 1973.

6. Maria Mies, *Patriarchy and Accumulation on a World Scale*, London: Zed Books, 1986.

7. Alice Schlegel (ed.), *Sexual Stratification: A Cross-Cultural Study*, New York: Columbia University Press, 1977.

8. Quoted in Muriel J. Hughes, *Women Healers in Medieval Life and Literature*, New York: Libraries Press, 1968, p. 86.

9. J. Bandyopadhyay & V. Shiva, 'Ecological Sciences: A Response to Ecological Crises' in J. Bandyopadhyay, *et al., India's Environment*, Dehradun: Natraj, 1985, p. 196; and J. Bandyopadhyay & V. Shiva, 'Environmental Conflicts and Public Interest Science,' in *Economic and Political Weekly*, Vol. XXI, No. 2, Jan. 11, 1986, pp. 84–90.

Measuring up to Sustainability

Alan Fricker

Over the past two decades interest has grown in developing indicators to measure sustainability. Sustainability is presently seen as a delicate balance between the economic, environmental and social health of a community, nation and, of course, the Earth. Measures of sustainability at present tend to be an amalgam of economic, environmental and social indicators. Economic indicators have been used to measure the state of the economy for much of this century. Social indicators are largely a post-WWII phenomenon and environmental indicators are more recent still. Interest in developing these indicators largely began when their respective theatres became stressed and where the purpose was to monitor performance and to indicate if any ameliorating action was required. Whereas economists have no difficulty deriving objective and quantitative indicators (their relevance is another matter), sociologists had and still have great difficulty in deriving indicators, because of intangible quality of life issues. Environmental scientists have less difficulty when limiting themselves to abundance of single species rather than biodiversity and ecological integrity.

Sustainability, however, is more than just the interconnectedness of the economy, society and the environment. Important though these are, they are largely only the external manifestations of sustainability. The internal, fundamental, and existential dimensions are neglected. Sustainability, therefore, may be something more grand and noble, a dynamic, a state of collective grace, a facet of Gaia, even of Spirit. Rather than ask how we can measure sustainability, it may be more appropriate to ask how we measure up to sustainability.

The Concept of Sustainability

Sustainability, at least as a concept, has permeated most spheres of life, not solely because it is a political requirement but because it clearly resonates with something deep within us, even though we have a poor understanding of what it is. The concept first emerged in the early 1970s but it exploded onto the global arena in 1987 with the Brundtland Report,[1] in which sustainable development is defined as *development that*

meets the needs of the present without compromising the ability of future generations to meet their own needs.

This very noble definition, however, defies objective interpretation or operational implementation. Most of us would see our own personal needs within the context of our circumstances rather than as absolutes. Our perceptions of the needs of future generations, therefore, beggar the imagination. 'How much is enough?' is a question we have to explore together but can only answer individually. Yet we rarely ask this key question of ourselves individually, let alone collectively.

Once the ecological integrity of the Earth is ensured and our basic needs are satisfied, how much is enough? The question should be posed mostly in the developed countries where, amidst the affluence, there is still inequity. Increasing and deliberate inequity at that, for it is a necessary feature of a growth economy and the driver of material self-advancement. Desirable though high standards of living may be, there are finite global limits. Since our concern for the environment decreases as we become more affluent,[2] we should not expect our quest for sustainability to increase as we become more affluent. Indeed, the few examples of sustainability that we have are where there is no affluence, the states of Kerala and Cuba, and in Amish and Mennonite communities. Here there is greater equity, justice and social cohesion. The challenge for the affluent developed world is to strive for equity and justice, whilst at the same time creating the conditions for appropriate qualitative development.

There are other definitions of sustainability which sidestep human needs, preferring to talk about ecological integrity, diversity and limits. These too defy objective interpretation. These deficiencies in the definitions, if that is what they are, cause much frustration to the rational mind, particularly for those trying to measure sustainability.[3] Meanwhile our reductionist mentality has tended to link it in a servile capacity to quantitative and productive activity, such as sustainable agriculture, forestry, land management, fisheries, etc. In consequence sustainable growth and sustainable development have been captured by the dominant paradigm where, for example:

> sustainable development is brandished as a new standard by those who do not really wish to change the current pattern of development[4]

and

> sustainable development alone does not lead to sustainability. Indeed, it may in fact support the longevity of the unsustainable path.[5]

But the concept is still with us and getting stronger.

We have a better understanding of what is unsustainable rather than what is sustainable. Unsustainability is commonly seen as environmental (in its broad sense) degradation, from the stresses of human population, affluence and technology on ecological and global limits. Since these stresses are all of our own construction, their control is, theoretically at least, within our capabilities. Human nature being what it is, we may push the global physical and biological capacities to their very limits, which will be survival rather than sustainability. Survival is merely not dying, whereas we probably think of sustainability in terms of justice, interdependence, sufficiency, choice and above all (if we were to think deeply about it) the meaning of life.

Sustainability, therefore, is also about the non-material side of life—the intuitive, the emotional, the creative and the spiritual, for which we need to engage all our ways of learning (being and insight as well as doing and knowing). Perhaps there are indeed some fundamental and universal truths if meaning and spirituality are components of sustainability. Morals and values, however, are not necessarily absolutes, and can be very difficult to define. Values, for instance, are qualities we absorb from our experiences. If our experiences confirm the implicit values, we are more likely to adopt those values. When our experiences continually contradict the implicit values we are more likely to modify our personal values to the projected values, i.e. we do as we are done by rather than as we are told. New ways of thinking need to emerge. Even Einstein recognised that *we cannot solve the problems that we have created with the same thinking that created them.* The very etymology of sustainability contains both its appeal and its paradox—*to hold together with tension.*

The beauty in our inability to define sustainability means that we cannot prescribe it. The future may then unfold according to our visions and abilities provided we recognise the global limits. Sachs[6] presents three perspectives of sustainable development: the *contest* perspective that implies growth is possible infinitely in time; the *astronaut's* perspective that recognises that development is precarious in time; and the *home* perspective that accepts the finiteness of development. These could be considered, respectively, as the perspectives of the dominant paradigm, the precautionary principle, and the conservationist. There are, and will be, many other perspectives.

For a generation now we have wrestled with the concept. We may have as much difficulty with sustainability as we did with the concept of evolution 150 years ago. Wilber[7] suggests that the whole of history, and thereby evolution and the future, is a collective transcendence or transformation. We have been ignoring subjective and non-physical dimensions of the collective self as well as the individual self. In so doing we have both created the ecological crisis and prevented ourselves from transcending it. Thus, any debate about sustainability is essentially a debate about ultimate meaning—the what, who, why and how am I. But we are extremely reluctant to engage in that debate on a collective basis, not even locally let alone nationally or globally, partly because it's messy, interpretive and time-consuming—the world of hermeneutics. There is, therefore, a crisis of perception. On this side of the crisis there is mainly banality, whereas on the other side we see only uncertainty and fear.[8]

The Social Discourse on Sustainability

There is little dispute that our present path is unsustainable. The challenge of sustainability is neither wholly technical nor rational. It is one of change in attitude and behaviour. Sustainability must therefore include the social discourse where the fundamental issues are explored collaboratively within the groups or community concerned. We do not do that very well, partly because of increasing populations, complexity, distractions and mobility, but more because of certain characteristics of the dominant paradigm that are seen as desirable.

Where the discourse does occur it tends to be structured and rational where aggressive debate is esteemed and other ways of knowing and experiential knowledge,

particularly of indigenous peoples, and feelings are disregarded. However, the process of discourse is as important as the analysis of discourse where knowing and acting could be seen as points on a journey, rather than as an end, as a start or a new beginning.[9] In sociological terms sustainability is an *absent referent* or the *absence of a presence*. Viederman[10] may have come closest to a definition with *sustainability is a vision of the future that provides us with a road map and helps us focus our attention on a set of values and ethical and moral principles by which to guide our actions.*

People, however, will not readily enter into abstract discourse, particularly where they suspect they will have to get by with less or that their standard of living will decline—at least not until the need for discourse becomes inevitable and perhaps too late. Agenda 21 requires developed countries to reduce their use of natural resources and production of wastes whilst simultaneously improving human amenities and the environment. That statement does not necessarily imply a reduction in the standard of living (defined for the moment as material consumption). Through greater efficiencies it could mean maintaining the standard whilst simultaneously improving the quality of life. In that event we would be more willing to enter into further discourse to see if further improvements in the quality of life can be achieved, even at the expense of the standard of living if necessary. Just as human needs are not absolutes, neither is the standard of living nor the quality of life. The mystics may well indeed be the enlightened ones. Involuntary simplicity on the other hand is a form of poverty. Simultaneously within this social discourse the visions for the future can emerge.

Viederman suggests three principles to underlie the discourse on sustainability:

1. the humility principle, which recognises the limitations of human knowledge;
2. the precautionary principle, which advocates caution when in doubt; and
3. the reversibility principle, which requires us not to make any irreversible changes.

Indicators in General

Monitoring and indicators have always been essential components of closed physical systems. They are integral to the scientific method. In this context each indicator should have a threshold and a target to guide political and social action. Their usefulness for closed socio/biophysical systems (e.g. human well-being, confined ecosystems) and particularly for open physical systems (e.g. corporations, national economies, regional sustainability) is still really unknown, in that accommodation of the full impact of the externalities may not be possible. Ultimately, however, the Earth is a closed system, except for the energy flux. In that sense accurate measures are theoretically possible at the global scale, but it is local measures that are potentially more meaningful and actionable. The impact of some issues, however, may only be evident globally, e.g. global warming and ozone depletion, whereas the solutions may be local.

Henderson[11] has written extensively on indicators, notably the chapter in *Paradigms in Progress* (Chapter 6). The proliferation itself of indicators is indicative of the confusion and uncertainty of what is to be measured, and perhaps the absence of debate and understanding.

Economic Indicators

There is much dissatisfaction with economic indicators, even among economists. Most would claim that they are not indicators of anything other than the economy. Some do not believe they are even meaningful measures of economic sustainability.[12]

The adherents for the most common indicator, the gross national product (GNP), now replaced by the gross domestic product (GDP), are getting fewer, but it is still widely used. Daly and Cobb[13] have developed the Index of Sustainable Economic Welfare (ISEW), which has recently been further refined as the 'genuine progress indicator' (GPI) by Cobb *et al.*[14] Consumption is still the base of the index, but instead of adding negative or deleterious consumption (e.g. defence, environmental protection) it subtracts them and adds previously unmeasured positive beneficial consumption (e.g. voluntary work, caregiving, housework). Whereas the GDP in the United States has continued to increase since 1950, the GPI shows a steady decline which mirrors people's experiences and perceptions of their well-being.

The GPI is a more realistic alternative to the GDP. The proponents of GPI presumably believe it is more likely to receive establishment endorsement by starting from the received wisdom. It is worth pointing out, however, that 50% of Americans consider themselves to be overweight, that 40% consider they consume alcohol in excess of 'moderation', that 70% of smokers would like to stop, and so on with gambling and credit card use. In other words, most of us are knowing victims of the consumer society and would like to change. Therefore, it is difficult to conceive how any index which has consumption as its base can be a measure of sustainability.

Furthermore, the GDP and the GPI are single indices. Both are aggregations of specific economic indicators. Whereas economic indicators may be equally responsive, in respect to time, to actions of adjustment, or can be meaningfully weighted in their aggregation, this is not true of social, environmental and sustainability indicators. Economic indicators are therefore not particularly useful as measures of sustainability, but economic considerations need to be factored in.

However, the very foundation of modern economic theory is suspect. Firstly, because it determines rather than reflects political and cultural development. Secondly, because it assumes scarcity of resources, most of which, until relatively recently at least, are in abundance. An economic theory that goes beyond greed and scarcity and which reflects human needs as suggested by Lietaer[15] is likely to yield much more useful indicators.

Social Indicators

There are broadly five types of social indicators: informative, predictive, problem oriented, programme evaluative, and target delineation. Many social indicators are in part economic, environmental and sustainability measures too. They can be comparative, between and within socioeconomic and ethnic groupings.

Objective conditions, such as the standard of living, are measured by analysing time-series information on observable phenomena. Subjective conditions, such as quality of life, are measures of perceptions, feelings and responses obtained through

questionnaires with graded scales. It is well known that there is little correlation in the level of well-being as measured by objective parameters on the one hand and subjective parameters on the other. There are considerable difficulties associated with the aggregation of indicators and in the design of weighting schemes. There can be aggregation of indicators of a similar nature, but in general aggregation, and certainly a single index, is uncommon.

Henderson[16] reviews the debate about indicators of progress suggesting the need to clarify the confusion of means (i.e. the obsession with economic growth) and ends (human development).

Environmental/Ecological Indicators

Environmental indicators tend to relate to the environmental sphere closest to human activity and can include economic, social and sustainability parameters too. They measure the quality of the living and working environment, usually for the three spheres of air, land and water, and may include measures of our productive use of resources, e.g. agri-environmental indicators. Ecological indicators relate more to ecosystems, where in some cases the human impact is not so evident. Indicators pertinent to the integrity of ecosystems and biodiversity are prominent. The OECD produced a pressure/state/response model which many countries have used in the preparation of their State of the Environment Reports, whilst focusing on their particular environmental/ecological issues.

Most of the indicators have, or will have, thresholds and targets. There is little desire or attempt, at present, to aggregate indicators or derive a single index.

Ecological Footprint

The ecological footprint is a useful measure for urban societies and industrialised countries, as they have become distanced from and are less aware of their dependence on the products of the land. It is a method for estimating the area of productive land required to produce the materials and energy required to support and to absorb the wastes generated by the present way of life. The average North American needs around 4 hectares to support his or her lifestyle. Vancouver depends on an area 24 times its size, and the Netherlands (as a small densely populated country) 14 times. If the rest of the world were to support such lifestyles we would need a planet with five times more productive land than it actually has.[17]

The footprint is an input/output measure of consumption, technological activity, and trade flows of all biophysical material needed by and produced by that city or nation expressed in terms of productive land area but using monetary conversions. It is a single index. Small cities or countries highly dependent on external flows (i.e. exports), and with little influence over international currency fluctuations, such as New Zealand, would have footprints highly susceptible to factors beyond their control. Footprints put relative numbers on what we already know or suspect, that cities and small densely populated countries are unsustainable. The footprint may be useful for internal and temporal reference, but there could be a tendency to compare

performance against other cities or countries and perhaps provide an excuse not to take appropriate action. Ecological footprints are therefore not particularly useful measures of sustainability.

Sustainability Indicators

Measures of sustainability at present tend to be an amalgam of economic, environmental and social indicators. The first two are amenable, but with difficulty, to quantitative measurement as they can be expressed in biophysical terms. There is a tendency to express social indicators in such terms too, but with less success. There is therefore a tendency to see sustainability only in biophysical terms.

Examples of sustainability indicators for a city and which reflect their origin in other indicators are:

1. income per capita ratio for upper and lower deciles;
2. solid waste generated/water consumption/energy consumption per capita;
3. proportion of workforce in the employ of the top 10 employers;
4. number of good air quality days/year;
5. diversity and population of specified urban fauna (particularly birds);
6. distance travelled on public relative to private transport per capita;
7. residential densities relative to public space in inner cities;
8. relative hospital admission rates for selected childhood diseases; and
9. proportion of low birth weights among infants by income groupings.

Boswell[18] advocates a theoretical basis for indicators of sustainable development based on our knowledge of sociology and ecology. He likens our stage of development to that of a climax community within an ecosystem succession. He then presents system attributes (energy use, community structure, life history, nutrient cycling, selection pressure and equilibrium) in terms of goals for sustainable communities. These number 23 necessary but not sufficient conditions. Boswell evaluates these goals against the indicators selected by Sustainable Seattle[19] and the ranking that Hart[20] has given over 500 indicators. Although an approach based on human ecology is clearly appropriate, Boswell does concede that the communities themselves should determine the strategy and the indicators.

Whereas these are facets of sustainability, we must look beyond conventional measures to include a sense of quality of life, well-being, belonging, relatedness, and harmony. We may have to be prepared to accept semiquantitative and even qualitative indicators.

Environmental and social indicators are rarely expressed as a single index. Nevertheless, there is some interest in developing a single index of sustainability based on a weighting of a selection of economic, environmental and social indicators. Such an index cannot possibly cater for response times that range from a few years (e.g. medical intervention) to generations (e.g. global warming).

Criteria for the Selection of Sustainability Indicators

The monitoring of sustainability is a long term exercise. As much as we would like the criteria for selection and the indicators themselves to be appropriate over a long time frame we are on a steep, and perhaps long, learning curve. We will need to be flexible, for our ideas and preferences will change with time. The criteria and preferred indicators could be different for the groups who will choose and use them. Expert systems may be appropriate.

Professionals may prefer quantitative, and if necessary, complex criteria that are amenable to rigorous statistical analysis. Some may wish to reduce a large group of indicators to a single index of sustainability. Communities on the other hand may prefer, or be prepared to accept, qualitative criteria and few indicators in the interests of simplicity and direct relevance. If we exclude qualitative criteria because they are not readily amenable to objective analysis we are likely to exclude some essential features of sustainability.

There are many sets of criteria (e.g. Liverman,[21] Sustainable Seattle). They range from the simple (the efficiency, equity, integrity, manageability of Opschoor and Rejinders)[22] to the complex. Hart believes that the best measures may not have been developed yet but suggests the following criteria:

1. multidimensional, linking two or more categories (e.g. economy and environment);
2. forward looking (range 20–50+ years);
3. emphasis on local wealth, local resources, local needs;
4. emphasis on appropriate levels and types of consumption;
5. measures that are easy to understand and display changes;
6. reliable, accurate, frequently reported data that are readily available; and
7. reflects local sustainability that enhances global sustainability.

Many of these criteria are short on human or social criteria, such as quality of life, sense of safety and security, sense of relationship to others and our connectedness with the Earth. A criterion that doesn't appear to be mentioned is one that reflects the degree of choice an individual has in an action. Most of us are locked into systems of our own collective construction within the dominant paradigm, many of them unsustainable, where the choice to be different can be socially, economically and practically difficult. Examples include the use of solar radiation and rainfall upon one's own house, and the choice not to own a car. Much more sustainable actions could result where the individual can make choices free of systemic pressure and economic distortions.

Risk Analysis and Comparative Risk Assessment

As in all theatres of qualitative and insufficient or imprecise quantitative information and uncertainty, where much is at stake and there may be several options for action,

risk analysis can help in selecting the preferred, the least cost, and/or the least risk option. The poorer the information and the greater the uncertainty, the more risk analysis may need to be used. At a time when we are confronted with a whole barrage of different issues and problems with insufficient resources, a prior analytical stage has emerged—that of comparative risk assessment. This technique ranks the issues/problems according to the urgency, cost and likelihood of success. The proceedings of a conference to debate, and no doubt advance, the technique presents just as convincing arguments against comparative risk assessment as it does for.[23]

Too often we argue we have insufficient information, or inappropriate information, upon which to take sound objective action, particularly action affecting sustainability. Yet in our hearts we know there are systemic functional deficiencies, both within ourselves and in our organisations. Rather than make a personal, corporate or political decision we call for more information, for more research. We prevaricate. Too often that information or research adds to the uncertainty or controversy. Valuable time is lost and yet more unnecessary work is embarked upon. We know the direction our action should take even though we do not know precisely what it should be. We lack the collective will to do so because we do not collectively address and own the problem. Much publicly funded research and development is a surrogate for social action. Many of the problems and solutions are neither technical nor entirely rational. A new mythology needs to emerge and that may be sustainability.[24] They are soluble only through social action, where the populace as well as the technical experts become informed on the issues and make informed recommendations to the decision makers.

Limitations of Measures of Sustainability

Even though we cannot define sustainability objectively and unambiguously, we should not abandon or defer attempts to measure it. Even if we come to recognise that there are other equally valid ways of learning, we have to start where we are, which is within a highly reductionist, rational, material, and acquisitive world.

We can define limiting aspects of sustainability (e.g. the sustainable productive capacity of a specific area of land, or the carrying capacity of the world) and trends in the direction of sustainability (e.g. greater use of public transport, more equitable distribution of income) and choose indicators that are appropriate and meaningful. The former would be thresholds below which we enter an unsustainable state. The latter would be directions in which we need to move. Many in fact are really indicators of unsustainability. Many debates and studies about the measurement of sustainability do not define, or even derive a common understanding, about what is to be measured. The context of sustainability cannot be separated from its measurement.

We should acknowledge at the outset the limitations of quantitative measures and that any measures are merely *the finger pointing at the moon* (a Zen saying). But we must be on our guard to keep well clear of thresholds. Surplus 'capacity' may be a spur to further inane growth and consumption. International trading in sustainability units could mean we all arrive at global survival (not sustainability) together. Biophysical measures are really measures of how close we are to the carrying capacity of

the Earth. Thus, biophysical measures are only indirect, partial and limiting measures of sustainability.

Even though sustainability is about the quality and other intangible non-physical aspects of life, that does not mean we may not be able to derive measures for them. Just as biological indicators (e.g. trout) are now used to measure the quality of industrial effluents, in addition to conventional chemico-physical indicators, we should be able to derive parameters that measure how well we and the Earth are as we swim around within the maelstrom of life.

Initiatives to Measure Sustainability

Sustainability indicators are being developed and applied at the grassroots level—the communities themselves, e.g. Jacksonville, Pasadena, Seattle in the USA, and at the institutional level in Europe, and North America. These indicators tended initially to be a potpouri of the three types above and there are still resemblances. As communities learn from the experience of others more appropriate and community-specific indicators should emerge.

The most promising of overseas initiatives to monitor sustainability are those that the public have initiated, and who largely retain 'ownership' and control, e.g. Sustainable Seattle—despite the fact that only eight of the 40 indicators have shown some improvement. Technically they may be flawed, but the success lies not in the indicators themselves but in the process and the participation, for it is here that the real debate and the sharing occurs and the mutual voluntary adjustments can be made. There is a limit, however, to the extent to which individual voluntary adjustments, or pressure for collective adjustment, can be made when our attitudes and behaviour may have been shaped more by the nature of our society (our systems of governance and organisation) than from free choice. In other words, if systemic change (e.g. to our economic system) is needed, it may be easier and quicker if it is effected by those with the power and influence.

The discourse of sustainability is part of the process of working towards sustainability. We will find we will know we are becoming more sustainable without having to measure it. Part of that discourse will be measures of sustainability, both the relatively easy that measure proximity to thresholds and directions, and the qualitative. But they will be consequential, for the hard graft of achieving sustainability will have begun. Therein lies the success of initiatives like those in Seattle.

The commencement of that discourse is the challenge. It is already in progress within NGOs and environmental and social change groups, but they may not see their particular window of interest as progress towards sustainability.[25] The discourse needs to be extended to the community at large, to local communities, to open debate of the big issues ahead of us, and to a more effective and participatory democracy. Local communities need to renegotiate the meaning of community in the modern world and find avenues for expression. Citizens' juries and consensus conferencing are great vehicles for exploring these deep and wide issues.[26]

Conclusions

1. There is growing acceptance for the concept of sustainability despite our inability to objectively define it and therefore to implement it.

2. Sustainability is more than ensuring ecological integrity and the standard of living. It is about the quality of life and thus addresses the ultimate questions about meaning in life.

3. Sustainability is as much a process of discourse and effort as it is a state.

4. Institutional initiatives and debates about measuring sustainability are reluctant to engage with the concept of sustainability. Thus, there is no common or shared understanding of what is to be measured.

5. Sustainability indicators are often an amalgam of economic, social and environmental indicators, but show signs of maturing into better measures of sustainability.

6. Such indicators, however, are limiting measures reflecting unsustainability and survival rather than sustainability. Their main value is in indicating direction of change rather than a desirable state.

7. Indicators are the map, not the territory (the finger pointing at the moon). The hard work of achieving sustainability lies elsewhere.

8. The most successful initiatives to measure sustainability are those initiated and controlled by autonomous public groups (e.g. Sustainable Seattle), where the process is more important than the indicators.

9. The greater the effective participation in democracy, in executing the role of community, in consensus conferencing, in citizens' juries, etc., the more chance we have of achieving sustainability.

10. We will need to address the fundamental existential questions and seek meaning in life if we are to achieve sustainability. As we seek to measure sustainability we should be asking ourselves how we ourselves measure up to sustainability.

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Conserving Biodiversity

Biodiversity preservation is becoming a growth area for anthropologists. Ben Orlove sets the theoretical stage for these examinations by noting the importance of political economy to ecological studies. Orlove thinks about how conflict and certain kinds of decision-making shape the physical environment. Writing in 1980, Orlove challenges anthropologists to include social processes and individuals as active agents in their interactions with nature.

Anthropological research on biodiversity preservation largely has followed Orlove's path. In this section, Hill and Haenn look at biodiversity conservation from global and local perspectives. Hill describes the opposing priorities of national governments and nongovernmental groups in negotiations to regulate trade in elephant ivory. Haenn reviews local reactions to a Mexican biosphere reserve to demonstrate how protected area models both contradict and complement local ideas of land management.

Throughout the world, protected areas, including national parks, have been the chief tool of biodiversity preservation. Recently, parks have been criticized as colonialist models imposed by outsiders on local people. In this section's polemical piece, Kent Redford, Katrina Brandon, and Steven Sanderson, writing in association with The Nature Conservancy's program to support park operations, make the case for the enduring relevance of protected areas. Michael McRae reports on sales of primates in Africa for meat and pets. McRae's graphic descriptions raise important ethical considerations for the human species, which has driven its nearest evolutionary kin to the brink of eradication. McRae's report on the dual effects of logging (for export) and hunting (for national consumption) on primate populations recasts the connections between global consumerism (see Section 7) and local demographics (see Section 2).

This section also includes a brief selection of Arturo Escobar's writing, which challenges us to see biodiversity itself as a cultural product. While not explicitly a reflection on the ethics of species loss and biodiversity protection, Escobar's writing leads readers in two directions for ethical consideration. The first direction is the extent to which language shapes our notions of right and wrong and even the existence of an object worthy of ethical consideration. The second direction is the question of to whom natural resources belong and who is responsible for their future? As ethical writers throughout the reader imply, questions such as this go beyond merely figuring out the mechanics of environmental management. They also impinge on the construction of a community around those resources that agrees to regulate resource use in a way that is generally fair to all members of that community.

The Third Stage of Ecological Anthropology
Processual Approaches

Ben Orlove

In contrast to the work of Steward and White and the neoevolutionary and neofunctionalist schools, a third set of approaches in ecological anthropology has begun to emerge in recent years. The research that is being carried out cannot be characterized as strongly as in the two previous stages as sharing a large number of assumptions, but it does question the neofunctionalist approach along the lines indicated above. This work will be called "processual" ecological anthropology. The use of the term "process" has been used earlier by other writers (6, 53, 57, 61) to refer to the importance of diachronic studies in ecological anthropology and to the need to examine mechanisms of change. However, the term "processual ecological anthropology" to describe current developments in the field does appear to be new. Important trends are (*a*) the examination of the relation of demographic variables and production systems, stimulated in part by Boserup's work (16); (*b*) the response of populations to environmental stress (81, 92, 93); (*c*) the formation and consolidation of adaptive strategies (10–12, 14, 22, 23) which follow Barth's early work on the use of the concept of the niche (2); and (*d*) new work in Marxism, including the emerging interest of anthropologists in political economy and structural Marxism. The studies are called processual because they seek to overcome the split in the second stage of ecological anthropology between excessively short and long time scales (5, 29–31). More concretely, they examine shifts and changes in individual and group activities, and they focus on the mechanisms by which behavior and external constraints influence each other. These points indicate the importance of the incorporation of decision-making models into ecological anthropology. Like the neofunctionalist and neoevolutionist ecological anthropology, processual ecological anthropology examines the interaction of populations and environments (26) rather than treating the latter as a passive background to the former. There are strong parallels between processual ecological anthropology and current work in biological ecology; the nature of these resemblances is the subject of some analyses which seek to link anthropology and biology in a more rigorous manner than has previously been the case.

Actor-Based Models and Processual Ecological Anthropology

A major influence on the processual ecological anthropology is the actor-based models which have received general interest in social anthropology. The literature on these models is large and diverse; one particular focus, decision-making models, will be emphasized here. The actor-based models form part of a general shift in postwar anthropology in both Britain and the United States from social structure to social process, from treating populations as uniform to examining diversity and variability within them, and from normative and jural aspects to behavioral aspects of social relations. Firth's (32–34) distinction between social structure and social organization is a major point of departure. He underscored the importance of variability in decision making and individual behavior, and demonstrated that many social systems contain options among which individuals must choose.

The actor-based models have several advantages: they account for a wider range of social organization than previous models do; they permit a more precise analysis of the parameters of behavior and the variation of behavior within populations; they admit more readily an examination of conflict and competition; and they offer the potential of examining change through an analysis of the processes which generate economic, political, and social relations. One important aspect of actor-based models is decision-making models, which may be loosely divided into two types: cognitive or naturalistic models and microeconomic models. These types are not necessarily opposed, as attempts at synthesis (24, 48) show; they remain, however, largely distinct. The former, borrowing from cognitive anthropology, attempt to depict actual psychological processes of decision making by locating the cognized alternatives and the procedures for choosing among them. Quinn (74, p. 42) distinguishes within these among "information processing models," "retrodictive models," and "models of cultural principles." These types all tend to be employed to analyze contexts in which individuals must select among a small number of alternatives, often on the basis of consideration of social status. Postmarital residence and adoption are common topics. These models offer useful links between studies of native systems of classification and actual behavior; such ethnosemantic models have been developed for the planting decisions of Brazilian sharecroppers (50–52) and the marketing decisions of West African fish vendors (37). These models often are applied to situations in which alternatives are finite and may be distinguished by discrete rather than continuous variables. The parameters which affect the choices tend to be few in number, and the outcomes of choices are certain, or nearly so.

The microeconomic models resemble economic models of choice making. Actors operating under a set of constraints allocate scarce resources to a hierarchical series of ends or goals. Many such models assume that actors attempt to maximize some valued state, although some authors have proposed more complex models of optimizations such as "satisficing," minimax strategies, and hierarchies of strategies (8, 84). In this fashion they avoid the rigidities often attributed to models of rational actors (46). There is a large concern with the *outcome* of the decision and less emphasis on the *process* of decision making. These models are applied to situations with greater uncertainty and ambiguity, where the range of alternatives and the outcomes of choices

are less well defined. The alternatives may be distinguished by continuous as well as discrete variables, and many parameters may influence them. Barth's (3) efforts at generative models of social organization are an example of such work. Borrowing from game theory, he attempts to explain political organization among Pathans as a structure which had emerged from a large number of individual decisions made by actors operating under different constraints. Ortiz's (71, 72) studies of planting and marketing decisions by small-scale farmers in Colombia are another example. Although these models can be criticized for taking the goals and constraints as givens and failing to examine the patterns of resource distribution, they have been of considerable use in anthropology as in political science and economics.

The potential links between ecological anthropology and actor-based models are strong, but they have not been utilized extensively. Ecological anthropology, particularly in its first two historical stages, emphasized the importance of environmental factors in shaping collective patterns of behavior. The neglect of the examination of individuals which this focus has often produced may be explained in part by the repudiation of the examination of individual actors by early ecological anthropologists (97) and in part from the neofunctionalist and neoevolutionist emphasis on systems in which aggregates and aggregate variables were accorded more importance than individuals. Conversely, actor-based models have tended to treat environmental variables as part of a relatively static set of external constraints to which individuals respond and adapt. This tendency is particularly strong in studies which focus on small areas in short periods of time. They have thus omitted some of the concerns of ecological anthropology. Despite the lack of effort in this direction, ecological anthropology can offer actor-based models a richer understanding of the dynamic that operates within the system of constraints; and actor-based models can permit ecological anthropology to examine the proximate factors which influence the behavior of individuals and of aggregates. The integration of the two is particularly favorable to the processual studies in ecological anthropology; the ecosystem and decisions made by individual actors affect each other reciprocally.

Components of Processual Ecological Anthropology

Demography. Demographic decision-making models are closely tied to the specific trends in processual ecological anthropology mentioned earlier in this section. They bear on the recent work in demography and anthropology which has contributed to processual ecological anthropology. Neofunctionalist work emphasized negative feedback mechanisms which maintained populations at static levels; neoevolutionists looked at the broad details of human demographic history, and often missed the details of particular cases.

A seminal work in this field is Boserup's *The Conditions of Agricultural Growth* (16). Her well-known hypotheses reverse Malthusian descriptions of human demography to suggest that population pressure causes rather than follows agricultural intensification; people shift from more efficient extensive systems to less efficient intensive ones only when driven by the necessity of feeding more individuals. The general

outlines of her argument and the details of her sequence of stages in agricultural intensification have attracted a great deal of attention. Many authors have pointed out the shortcomings of her excessively simple scheme, and indicate that other factors can also influence the sequences of agricultural intensification; these include market systems, political pressures, and environmental variables. Boserup's work and studies by Spooner (86) and others (4, 7, 13, 22, 28, 39, 44, 45, 62, 63, 89, 96) stimulated by it may be classified as processual, for several reasons. The effort to assess the links between population pressure and agricultural intensification have led to diachronic studies (62) in which changes in single groups are traced through time; research in other areas for which little historical reconstruction is possible has been carried out by examining the covariation of population density and agricultural intensity (19), with the assumption that current distribution of associations resembles past sequences. The studies often rest on an implicit decision-making model in which actors actually allocate scarce resources (labor) in order to achieve goals (food production). The mechanisms of change are seen in the connection between population and resources, linked through systems of agricultural production and the necessity to feed local populations. Individual decisions have cumulative consequences which lead to broader change; shortening of fallow periods may lead to a shift from communal tenure to private property, for instance. Other work links demographic and ideological change (9).

Environmental Problems. Vayda & McCay (92, 93) argue that the literature on the response to environmental problems is an important shift away from the strong focus on energetics and from the assumption of stable equilibrium; as they show, it also permits an examination of individual as well as population responses to environmental forces. Waddell's (94) work on the response of the Fringe Enga in highland New Guinea describes three types of responses to three levels of frost intensity and duration, with larger (though still subpopulation) sets of individuals acting in cases of more severe potential or actual damage to crops. Earlier work by Vayda (90, 91) and others (43) on the nature of warfare and the choice of different forms of attack rather than other responses to certain situations similarly makes the point that the nature of the response can be correlated with the scale of the problem. Other works show that responses can vary on individual as well as collective levels to natural stresses such as storms (7), droughts (57, 66, 73, 76), famine (54, 70), and earthquakes (65). Laughlin's (55, 56) well-documented analysis of the responses of the So in East Africa to periodic crop failures is another good example of use of decision-making models and the analysis of environmental problems. Britan & Denich (18) address similar issues in Newfoundland and Yugoslavia in cases of secular rather than cyclical change. Some efforts (64) have been made to quantify environmental hazards.

Adaptive Strategies. The notion of adaptive strategy follows closely from that of decision making. The idea of adaptive strategy suggests that individuals, by repeatedly opting for certain activities rather than others, construct alternatives which others may then choose or imitate. It is also congruent with the emphasis on strategies and fitness in evolutionary biology (88). A focus on adaptive strategies leads to an examination of the manner in which a larger number of choices made by individuals can

influence the wider setting (14, 24, 59, 85, 87, 95, 98). Rutz's (78) analysis of household decision making in a Fijian valley, for instance, shows the unplanned village-level consequences of interaction between households and their resolution of competition over different types of land. McCay (61) examines two types of adaptive strategies among Fogo Islanders as responses to a period of decline in the nearby fisheries. Individuals and households may adopt "diversification" and "intensification" responses, and the latter in particular led to outside intervention by governmental agencies, which made the environmental problems more severe. The concept of adaptive strategy, however, is often more elusive than one might suspect, as suggested by definitions such as Bennett's (10, p. 14): "the patterns formed by the many separate adjustments that people devise in order to obtain and use resources and to solve the immediate problems confronting them." The issues of the consciousness of the adaptive strategies and the ease with which they may be adopted are often not wholly confronted; the same work by Bennett on a region in the Canadian Great Plains recognizes four strategies (rancher, farmer, Hutterite, Indian) but does not fully examine the consequences of the fact that it is easier for farmers and ranchers to shift between those two strategies' than to adopt the Hutterite or Indian one.

Marxism. It is at this juncture that the contributions of Marxism become evident. The important role of Marxism in the two earlier stages of ecological anthropology makes its contributions in the third stage appropriate. If adaptive strategies are seen as the outcome of decision making, or repeated allocation of scarce resources to a hierarchy of goals under conditions of constraint, then it is necessary to examine the pattern of resource distribution and the source of the goals and constraints. This is precisely the contribution of recent work in Marxism, including much structural Marxism (15, 36, 38) and the new political economy. In particular, a reconsideration of the notion of mode of production questioned the rigid sequence of succession of modes and the determination of the superstructure by the base (47, 58, 68), paralleling a rejection of neoevolutionism and neofunctionalism. Dependency theory raised similar issues on the relation of economics and politics and suggested the importance of an examination of world systems. This work is compatible with the emerging interest in political economy within anthropology (1, 20, 25, 40, 42, 49, 60, 67, 77, 82, 83), the concern for a historical materialist perspective (27), and an emphasis on the links between local populations and wider systems (17, 21, 79), including regional studies (6), studies of complex society (99), and a world-systems perspective (69). This work thus contrasts with the neofunctionalist ecological anthropology, which often adopted the local population as its unit of analysis. For a structural Marxist critique and reply, see (35) and (75). Each social formation may be seen as having a characteristic set of forces and relations of production and an associated superstructure. This social formation is pushed toward transformation by conflicts within the base, between the base and superstructure, and between the social formation and its wider natural and social setting. Any social formation is a transformation of the ones that preceded it. This criticism is similar to the one made by Sahlins, that ecological anthropology reduces culture to "protein and profit" (80, p. 45), that it misses the fact that activity and ideology form a coherent structured whole of meaning and its expression. This

criticism also attacks the lack of satisfactory treatment of the mechanisms which generate human behavior on the part of many neofunctionalists and neoevolutionists.

Conclusions

Processual ecological anthropology is a reaction to neofunctionalist and neoevolutionary approaches, which were also responses to the pioneer work of Julian Steward and Leslie White. Adopting an historical time frame, rather than examining synchronic homeostatic equilibria or the many millenia of human history, permits a closer focus on mechanisms of change. By studying units other than the local population on which the neofunctionalists concentrated, studies have been carried out of larger units (political economy) and smaller ones (actor-based models). The elimination of functionalist assumptions has had several consequences: (*a*) a focus on the mechanisms which link environment and behavior; (*b*) an ability to incorporate conflict as well as cooperation by recognizing that not all goals are population-wide; (*c*) more precise studies of productive activities, settlement patterns, and the like without assumptions about equilibrium maintenance.

Processual ecological anthropology draws on several recent trends in the social sciences: demography, an examination of environmental problems, the concept of adaptive strategies, and recent work in Marxism. Decision-making models link all of them. The gap between anthropologists and biologists is also narrowing, as specialists in each field become more aware of work in the other and have begun efforts to link the two theories (as in dual inheritance approaches) and to borrow more cautiously than in the past. The homologies between actor-based models and natural selection favor this connection between sciences without assuming that they are virtually identical as the sociobiologists do, and the ecosystem ecologists, neofunctionalists, and neoevolutionists did.

The incorporation of decision-making models as mechanisms of change has led to a greater emphasis on social organization and culture. Social and cultural systems influence the goals which actors have, the distribution of resources which they use, and the constraints under which they operate. It appears likely that the comparative work in ecological anthropology will emphasize culture areas, as in the Pacific, European, Mayan, and Andean cases mentioned here, as well as the comparisons of evolutionary stages and production types which characterized the neofunctionalist and neoevolutionary stages. As this work progresses, materialist and idealist approaches in anthropology are likely to find more common ground through a more thorough interpretation of culture and ideology as systems which mediate between actors and environments through the construction of behavioral alternatives.

As ecological anthropology draws closer to biology and history, it becomes enriched and enriches other fields. Although it incorporates models and research methods from other areas of anthropology and other disciplines, it must rework them to suit its own needs rather than adopt them blindly. This association with other fields, however, creates the danger of a fragmentation of ecological anthropology into a series of specialized areas of inquiry. The current diversification, though it shows a growth

of new lines of productive research, could lead to a loss of analytical coherence. An examination of theoretical issues and of the complex history of the field is therefore an urgent task. Future developments in ecological anthropology thus rest on an understanding of the new common elements in processual approaches—the importance of the time frame, the role of actor-based models, a clearer focus on mechanisms of change, and a more balanced position on the role of social organization, culture, and biology.

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Conflicts over Development and Environmental Values

The International Ivory Trade in Zimbabwe's Historical Context

Kevin A. Hill

The Colonial Legacy of Conservation in Zimbabwe

Beginning with the establishment of the settler colony by Cecil Rhodes' British South Africa Company in 1890, the African population of Zimbabwe endured land alienation unsurpassed in its scale anywhere on the African continent. Through legislation and taxation schemes, rural farmers were either forced into the growing mining economy of the colony or into marginal, fragile scrub and dustland farming areas. Indeed in 1991, over 100 years after the Pioneer Column established Salisbury, 40 per cent of Zimbabwe's arable land is still held by less than 1 per cent of the population, most of whom are descendants of the settlers. But taxation and Colour Bars were not the only schemes used by the various colonial regimes to take the best land for themselves; wildlife preservation schemes also led to land alienation, and created a hostility to wildlife conservation among local people that still must be battled today.

Not only were rural farmers moved off the best land; they were also prohibited from hunting wildlife on the meagre lands allocated to them (IUCN, 1988). In pre-colonial days (before 1890) wildlife probably survived because of low human population density, and because people utilised wildlife sustainably as a food resource (Taylor, 1992). The last of the Ndebele kings, Mzilikazi and Lobengula, attempted to limit European hunting in their territories. Lobengula explicitly banned the hunting of female elephants and the gathering of ostrich eggs, and tried to restrict white hunters to certain ranges, and charged trophy fees (Thomas, 1991).

Suddenly, with the advent of white settler colonialism, the Rhodesians became the gamekeepers, and the Africans the poachers. Whereas the local people had once hunted game both for food and ritual, what had once been a practice of everyday life now became illegal. They were even barred from killing elephants and other dangerous animals which threatened their crops. Thus, rural farmers had to suffer the

consequences of living with wildlife while reaping no benefits from them, and having no say in their management. In this atmosphere of conflict and obvious lack of concern by the authorities for creating truly meaningful grass roots participation in conservation programs, rural farmers would rather be rid of wildlife than tolerate its presence; consequently, the conservation message had little meaning to these people (IUCN, 1988). Indeed, evidence of this attitude persists today. In a baseline sociological study of Chapoto Ward in northeastern Zimbabwe, researchers found that 84.8 per cent of respondents said wildlife had no value to their households whatever.

The Transitional Period: 1980–1981

According to Shadrack Gutto, former lecturer in law at the University of Zimbabwe: 'conservation is a religion through which a wealthy elite worship nature' (*Zimbabwe Wildlife*, 1989, 22). In the Zimbabwean context, the word 'whites' could safely be substituted for 'a wealthy elite.' The history of wildlife conservation does carry elements of racism, particularly the early land conservation laws. This legislation left an anti-conservationist legacy among local people, to which Dr. Callistus Ndlovu, MP, referred in Parliament in 1981:

> let me say that during the struggle for independence, and in fact as far back as the 1950s, there was a great deal of resistance from the African population to any conservation programme. This was not because the African majority was opposed to conservation as a principle, or as a means of preserving the natural resources of this country. It was in part their political resistance. I say this, because at a certain point in time, those of us who were involved in the struggle for independence did encourage people not to cooperate with certain programmes for conservation, and thus might have created an impression not only among our own supporters but also among those who are charged with this responsibility that we are not interested in conservation (Parliament, 1981, 943).

In independent Zimbabwe, these attitudes still affect the policy environment in which any conservation programme must operate. Immediately after independence in 1980, a wave of elephant poaching swept the communal lands and national parks. According to one game warden, as much as 90 per cent of this poaching was not for ivory, but because the preservation of wildlife, especially those in the national parks, was associated with white rule (Timberlake, 1985).

This suspicion of conservation on racial grounds has carried over into the governmental attitude toward NGOs and to some conservation legislation. One example of the latter is the debate over the Natural Resources Amendment Bill in 1981. Part of this bill sought to curtail the authority of the Natural Resources Board, an advisory board to the Department of National Parks traditionally dominated by whites. Previously, the NRB had the authority to block large public works projects if they were deemed by the Board to be harmful to the environment, under the Native Land Husbandry Act of 1950. In an act of mistrust, the amendment took this power out of the hands of the NRB, because, the Minister of Natural Resources and Tourism said, '[such power] could be obstructionist to development in areas neglected by previous governments'

(Parliament, 1981, 1564). Further, the nature of relations between Government and Zimbabwean conservation groups is tainted by the dichotomous racial makeup of the two parties. This was noted in a December 1987 editorial by veteran conservationist Dick Pittman, who said:

> let's be quite blunt; we only have to look at the ethnic composition of most voluntary [conservation] organisations to recognise that we may be in danger of becoming irrelevant. (Pittman, 1987, 5)

Indeed, of the ten members of the Zimbabwe National Conservation Trust coordinating committee who represent conservation NGOs, as late as 1989, all ten were white.

Clearly, then, whites retain a more obvious interest in conservation issues than do black elites and, by association, the millions of black rural farmers. This situation, and the historical reasons for it, certainly serve to constrain successful implementation of any conservation scheme, and inhibits the establishment of popular participation in conservation and human-wildlife relations.

The Contemporary Legal and Institutional Setting

The Parks and Wildlife Act of 1975 serves as the basis of contemporary Zimbabwean wildlife policy. As of 1993, wildlife generated US$60 million in tourism for the Zimbabwean economy (Taylor, 1992). Although not an insubstantial figure, this amounts to less than three per cent of Zimbabwe's GDP. Thus, wildlife policies which depend only on tourism and parks are probably not economically tenable. Recognising this fact, the Zimbabwe National Conservation Strategy of 1987 states:

> wildlife and protected areas are accepted as renewable resources that can and should be used correctly on a sustainable basis for the benefits of both the people and the resources. These benefits may take aesthetic forms such as scientific, cultural, and recreational values, or they may take material forms such as enhanced productivity from land. (Government of Zimbabwe, 1987, 4)

The Wild Life Estate—National Parks, Safari Areas, Recreational Areas, and Botanical Reserves—covers 12.7 per cent of Zimbabwe's land area. In addition, DNP is given oversight status for those commercial farms and ranches which have wildlife populations, and the wildlife in communal areas. Thus, the potential jurisdiction of the DNP is quite large, and this part of government is potentially a very powerful entity. The Parks themselves allow absolutely no consumptive use, and are based on the preservationist motivation so pervasive amongst environmentalists in the North. The Safari Areas cover almost as much acreage as do the National Parks, and are usually contiguous with parks. They allow camping, hiking, fishing, game viewing, and of course licenses hunting of plains game and big game—elephants, lion, buffalo, and leopard.

In its 'Policy for Wildlife', the government of Zimbabwe recognises that economic returns are an important part of conservation when mixed with the imperatives of economic development (Government of Zimbabwe, 1987). And with a three per cent population growth rate and severe overcrowding of many existing communal areas,

there are likely to be calls for the return of some National Parks and Safari Areas to agriculture. Even the Ministry of Environment and Tourism (MET), the parent ministry for the Department of National Parks, recognises this fact, but presently supports a policy of not opening any parks to agricultural development (Government of Zimbabwe, 1987). Further, with the dwindling of financial resources for the DNP, the complete protection (and even the effective protection of some important areas) may have to be reexamined in the future, given the political imperatives of massive land hunger, and the practicalities of dwindling government expenditure. If government is the only source of income for wildlife conservation, then this situation can only become worse.

The practical policy-oriented task, then, is for government to find alternative means of financing preservationist policies, or to opt for policies that involve the sustainable utilisation of species. Further, given the political culture of hostility to conservation, the successful environmental policy will seek to redress and reverse this opposition to wildlife conservation prevalent in the black population of Zimbabwe. This kind of policy, which Zimbabwe's Parks Act and National Conservation Strategy openly embrace, also has political ramifications. Since wildlife conservation takes place in parks, safari areas, communal areas, and on commercial farms, government must engage a broad spectrum of organised interests with very different motivations and organisational capacities. Before examining Zimbabwe's controversial ivory trade policies, one must come to grips with the explicitly political problems facing any wildlife conservation policy regime in Zimbabwe.

At least three major political problems confront successful sustainable development. First, the differences of access by social groups to the benefits and costs of natural resources will influence the ways those groups perceive the benefits of a given wildlife policy, regardless of its technical and economic merit in the aggregate. Second, the historical polarisation of attitudes toward wildlife between people with a preservationist perspective and those with a socio-economic approach will hinder the successful implementation of Zimbabwe's wildlife policies. In a related vein, the polarisation of attitudes between those 'comfortably concerned with ecosystems and sustainability' (Katerere et al., 1991, 67), and those concerned with their own safety and survival vis-à-vis wildlife will cause obvious problems for the design and implementation of sustainable utilisation policies. Third, the tendency by international agencies and regulatory bodies to impose environmental conditionality on developing nations without a full comprehension of and commitment to the developmental implications of these conditions, will affect Zimbabwe's policies when they interact with the international community.

Forms of International Environmental Persuasion and Regulation

Surely there are many ways for nations and groups of nations to attempt to regulate cross-national or cross-regional environmental problems. John Dryzek's book *Rational Ecology* (1987) is a rich elaboration of the 'social mechanisms' used in the international arena in attempts to regulate ecological integrity. According to Dryzek, the

world has nine major types of social choice mechanisms, existing at various levels: the market, administered systems, law, moral persuasion, polyarchy, bargaining, armed conflict, radical decentralisation, and practical reason. The last two of these are Dryzek's own constructs, but they are elaborated and modelled in a somewhat disappointing manner. Nevertheless, common sense tells us that mechanisms one, two, and three are ubiquitous. The first two mechanisms, the market and systems of administration, are almost always present in any attempt at national or international regulation. While ubiquitous, the market is at its weakest when confronted with rationally regulating common property resources, as discussed above. Further, when theorising about ecological politics and policy, moral persuasion through campaigns mounted by environmental groups has taken on importance, particularly in recent years. When combined with the international components of mechanisms six and seven (bargaining and armed conflict), one can discern an important theoretical interaction between moral persuasion and international bargaining and conflict over ecological problems of transnational scope. This interaction becomes especially politically important when one nation or group of nations perceives its environmental policy interests are in jeopardy. This is precisely the concern expressed by the southern African nations after the 1989 and 1992 ivory bans were imposed against their strenuous objections that such bans were not only unnecessary for their herds, but may actually be injurious to their own countries' ecological integrity, and totally ignore the historical context of wildlife conservation in the region.

The International Ivory Trade: Clashing Values and Historical Contexts

The markets for ivory are mainly in the Far East. The Japanese use ivory to make *hankos*, which are personal seals often used in place of signatures (Bradstock, 1990). Hong Kong, China, and Taiwan also have had extensive ivory carving industries for several centuries. There has also traditionally been consumer demand for ivory in Europe and North America as well, although consumers usually purchased their ivory indirectly, through the carving industries of East Asia.

Most observers agree the population of African elephants has been halved in the past 15 years (Barbier, 1991). What is not commonly appreciated, however, is that the decline of the elephant has not been consistent across the continent. In fact, while Kenya and Tanzania have seen their elephant populations decimated by poaching, the southern African nations of Zimbabwe, Namibia, Botswana, and South Africa have seen their herds grow over that period. Zimbabwe and Botswana claim their elephant herd growth is actually too high, and that if left unchecked, the elephant will destroy its own environment and physically threaten the people living close to them.

Indeed, poaching in eastern and central Africa has been the elephant's major menace[1]. Elephant and rhino poachers in Africa are often armed with AK-47 rifles, chain saws, and even rocket propelled grenades (Booth, 1989). Before Dr. Richard Leakey[2] took over the helm of the Kenya Wildlife Service in 1989, (when he convinced the government to burn $3 million in ivory), corruption was rife in the Kenyan government, with wildlife employees allegedly involved in poaching activities. To compensate,

Kenya called for a total worldwide ban on ivory. Through lectures, television programmes, and press interviews. Dr. Leakey became a high profile spokesperson for the worldwide ivory ban in 1989.

Thus, this dramatic policy shift away from government sanctioned (or at least government condoned) poaching to a complete ban on ivory occurred over a very short period (Morell, 1990). Further, Kenya instituted a shoot-on-sight policy for dealing with poachers. Zimbabwe has been doing this for over five years (Booth, 1989). In January 1989, after having seen its herds poached from 300,000 in 1979 to 100,000 ten years later, Tanzania began to crack down on illegal ivory trading by arresting the Indonesian ambassador, who was caught trying to smuggle 184 tusks out of Dar es Salaam.

The international regime which oversees the trade in species products is the Convention on International Trade in Endangered Species (CITES), which has over 100 members. CITES member nations usually convene every two to three years to consider proposals by members, and to review the level of international protection given to various plant and animal species. CITES offers three levels of protection for a species. Appendix One listing includes species threatened with extinction, and prohibits all trade in their products. The elephant has been listed here since 1989. Appendix Two is for 'threatened' species, and international trade in their products is only allowed with carefully monitored export permits from the producer countries. The elephant was on Appendix Two from 1974 to 1989. Appendix Three includes species locally endangered, and the listing of a species here constitutes a request for help from the host country to save the particular plant or animal. All parties to CITES may take reservations to listings in these areas, effectively opting themselves out of regulation.

Conflicting Approaches to Saving the African Elephant

After a chilly April 1989 meeting of African wildlife officials on the elephant, CITES Deputy Secretary-General Jacques Berney neatly phrased this distinction:

> on the one side you have those who believe in conservation, which implies utilisation of wildlife as an economic resource [the southern African nations]: on the other you have those who believe purely in protection, and their pressure on public opinion in the West is enormous … [Kenya and Tanzania]. You have people who would still want to ban the ivory trade tomorrow even if there were three million elephants in Africa instead of 650,000. (Morrison, 1989, 94)

Of course those who adopted a preservationist stance on the elephant were in favour of a complete ban on ivory trading, in order to shut down the demand for elephant products, and thus hopefully save the species. After the 1989 CITES worldwide ban on the ivory trade was imposed, the east African nations, along with nearly all the Northern nations, opposed any reopening of the ivory trade, even a partial one which would allow those countries who managed their herds efficiently to sell their elephant products. Even after the total ivory ban of 1989, the CITES Secretariat still acknowledged that Botswana and Zimbabwe had highly successful wildlife utilisation schemes, which had resulted in rising elephant populations over a period of fifteen years.

The argument that developing nations should be able to profit from their own natural resources was one supported in principle by the World Wildlife Fund at the 1992 CITES meeting, but they continued to voice concern about the free rider problems associated with attempting to police a partial ivory trade. Also, when they speak of sustainable utilisation of big game mammals such as elephants, Western conservationists usually refer to some form of high-priced eco-tourism, in which Northerners pay large fees to African governments for the privilege of viewing the animals in relatively pristine environments (Moffett, 1992).

On the other hand, those conservationists and nations which attempt to practice sustainable utilisation of wildlife view the situation very differently indeed. Zimbabwe and other southern African nations have been highly disturbed by the tendency of Western conservationists to rely on the force of law and the implementation of sanctions to protect the environment. Zimbabwe's philosophy of sustainable utilisation does not rest on enforcement of punitive law or moral persuasion, but on the fact that people who live near wildlife must be given an economic stake in its management (Parrish, 1989). As a result of a safari hunt by one wealthy American businessman, nearly $20,000 was raised for the Dande, Zimbabwe communal land, the area in which the safari took place. Most of the $20,000 trophy fee paid by the hunter built two new school buildings and a health clinic. In 1989, Dande made over $250,000 on carefully supervised elephant hunts; there is no poaching in this area, since local people have a firm economic stake in sustained management of the local elephant population (Morrison, 1989). Zimbabwe's sustainable utilisation philosophy, at least as it pertained to the African elephant, was keeping a comparatively large amount of money in the nation, and thus adding much value to raw ivory. This pre-ban situation accords well with state policy preferences, which seek to keep as much revenue as possible from ivory in country.

The 1989 and 1992 CITES Meetings: Moral and Economic Confrontations

At the October 1989 CITES meeting in Switzerland, a complete worldwide ban on the ivory trade was passed overwhelmingly, the protestations of the southern African nations that they had sustainable programs of elephant culling notwithstanding. Thirty-two per cent of all African nations voted against the ivory trade ban, while 35 per cent of Range states opposed the international ban on ivory. Of the eight range states voting against the ban, five were in southern Africa. The proposal by southern African nations to make an exception to the ban for them was shelved, with further discussion put off until the 1992 meeting of CITES in Kyoto, Japan. In the aftermath of the 1989 meeting, and in the run-up to the Kyoto conference, a war of words between southern Africa on the one hand, and east Africa and Northern environmentalists on the other, escalated to proportions rarely seen at scientific or diplomatic conferences. Recalling Dryzek's distinctions between different forms of social control, these verbal (and increasingly monetary) wars between people with different philosophies toward wildlife conservation are fascinating indicators not only of the importance that environmental protection has taken on in the global debate, but also of the conflict between using moralistic, economic, and regulatory mechanisms to bring about a mutually

desired international policy outcome. After its proposal to market ivory from carefully managed herds was rejected at the 1989 CITES meeting, Zimbabwe was painted by some conservationists in the Northern press as an uncaring conspirator with elephant poachers (Parrish, 1989). Greenpeace further condemned Zimbabwean culling operations, and accused the country of vastly over-counting its elephant population (Contreras, 1991). For its part, Zimbabwe joined in the verbal escalation. The semi-official *Herald* newspaper in Harare denounced 'well-fed and prosperous Europeans and North Americans, wearing leather shoes and tucking into high-priced meat dishes, telling African peasants that basically they are only on earth as picturesque extras in a huge zoo' (Morrison, 1989, 93).

Backing their government, several Zimbabwean conservation interest groups announced their continued support for elephant culling operations before the 1992 CITES meeting in Kyoto, Japan. The Zimbabwe National Conservation Trust, an umbrella group of Zimbabwe wildlife conservationist professionals and wildlife enthusiasts, backed resumption of ivory trade based on Zimbabwe's philosophy of sustainably utilising the elephant, and ploughing the proceeds back into rural areas and anti-poaching activities ('Conservation Trust Backs', 1991). The wars of words, however, resurfaced in the months preceding the Kyoto meeting to reconsider the ivory trade ban. The Environmental Investigation Agency and the International Wildlife Coalition, on the eve of the 1992 CITES meeting, claimed that Zimbabwe's Department of National Parks and Wildlife Management was demoralised, inefficient, and weakened by corruption. Further, Zimbabwean military personnel were supposedly involved in a massive ivory smuggling scheme through South Africa, and that top government officials in both countries were cooperatively engaged in an official cover-up of the matter (Orenstein, 1992). It is revealing of the moral/economic side of this whole debate how skilfully Zimbabwe is vilified by being lumped officially with South Africa, a country with whom it still has no diplomatic relations, and whom South Africa accused at the time of still harbouring ANC guerrillas. The UK Elephant Group, an umbrella organisation of British conservation groups, urged the British Overseas Development Agency to withdraw its funding for the post of Botswana's Director of Wildlife, as punishment for that country having joined Zimbabwe's crusade for a limited resumption of the southern African ivory trade, based on sustainable utilisation of the species ('Botswana Wildlife Job', 1991).

Switzerland was the only country outside of southern Africa to openly support the Zimbabwean-Botswanan argument that favoured a controlled trade in southern African ivory as an effective means of elephant conservation. The head of the Swiss delegation said 'many delegations took positions dictated by their home politics more than by scientific considerations' (Zingg, 1992, 3). He also used the term eco-colonialism to refer to the character of the whole debate on the southern African proposal, and how the North was ignoring southern Africa's history of wildlife conservation (Zingg, 1992). Similar comments were made by conservation professionals from other countries. The 1992 CITES meeting, normally made up of conservation and wildlife management professionals from mid level government bureaucracies, was in 1992 attended by an extraordinary number of government ministers who sat at the conference tables in front of their wildlife managers.

In the aftermath of the 1992 Kyoto meeting, in what was apparently a reaction to the events of the meeting, at which the southern African nations were rebuffed in their attempt to reopen a controlled trade in elephant products, new rules adopted by the body call for formal consultations with affected states before CITES trade bans can go into effect. The southern African nations, particularly Zimbabwe, had complained of 'eco-colonialism', in that they saw outsiders telling them how to utilise their natural resources. Further, the theory of sustainable utilisation of species was positively acknowledged by many present, which may be an indication that CITES is questioning the wisdom of total trade bans as a means of protecting species ('Four Southern African Nations', 1992). Undaunted, Namibia, Malawi, Botswana, and Zimbabwe announced they would make preparations to set up a southern African ivory trade, but did not outright commit themselves to an immediate resumption of the elephant products trade.

Further, Zimbabwe announced in July 1992 that, due to serious drought and the imperilled living conditions of both humans and wildlife, 2000 elephants in southeastern Zimbabwe would be shot, and the meat distributed free of charge among those in need of drought relief. Even in the face of serious human suffering, Western governments and conservation organisations have refused to provide funds for this culling operation. Instead, they have committed $1900 per elephant to tranquillise and relocate 1000 of these elephants to local private ranch lands, to set up new 'eco-tourism' industries ('U.S. to Help Zimbabwe', 1992).

The Consequences of Ignoring Environmental Historical Context

This paper has addressed the same question in different ways—how and why are international environmental agreements reached and implemented? First, the essay has had a broader interest in theory-building: international environmental policies are increasingly the results of an interaction of moral, regulatory, and economic attempts at large scale transnational persuasion. This has been an attempt to move forward important pioneering work by Oran Young and John Dryzek, by critically examining the interaction between these forms of policy persuasion, and by extending international environmental policy analysis to include the possibility of acrimonious conflict over ecological concerns. As environmental consciousness (however defined) moves people for various reasons in various parts of the world to form strong opinions about the global environment, and as economic development issues in the South potentially clash with this consciousness, such a theoretical rubric is needed by analysts concerned with global ecological policymaking. When combined with the traditional concerns of nation-states over sovereignty, this mix of variously-defined morality and economic development has a truly explosive potential, especially when a large percentage of the outside world ignores the constraints that 100 years of racist environmental policy has imposed on Zimbabwe's current attempts to change its citizens' attitudes toward elephant preservation. Further, future research should address any emerging North-South conflicts over the environment.

Second, this study has sought to put the specific question of elephant conservation into a framework which addresses the conflicts outlined above. Clearly, important ecological issues such as the survival of Earth's largest land mammal are not solely scientific, but are clouded by both moral concerns over the species' right to survive, and by the economic and safety concerns of those who must live near these potentially destructive creatures. As the above case study has shown, neither scientific nor economic arguments over how to best protect the species can remain untouched by appeals to morality and attempts by international interest groups to elevate elephant survival to this new level. Clearly, interest group politics is at work in this debate over how to best save the African elephant, and the question of the animal's survival is surely a larger issue. Indeed, the 1989–1992 (and continuing) debate over the international ivory trade is likely a harbinger of other international environmental debates, some of which will undoubtedly be more acrimonious than this one. The study of international ecological politics surely must seriously address this interaction of historical context, moral persuasion, administrative regulation, and economic development further, particularly when elements North and South take opposing sides, and the autonomy and power of developing states is influenced by foreign interest groups, no matter how well meaning.

NOTES

1. Unlike the case with almost all other threatened species, which are at risk because of habitat loss, the elephant and the black rhino are directly threatened by poaching. Further, as mentioned above, the concentrations of elephants in southern Africa are actually a threat to themselves, since the elephant, owing to its size and eating habits, will destroy a finite environment if populations grow unchecked. This is precisely what happened in Kenya's Amboseli National Park in the early 1970s, when, instead of prosecuting controlled culls of elephants, parks officials and ecologists let the herds grow unchecked. The result was that savanna land was turned into near desert, and thousands of elephants starved.

2. A paleontologist by training, and the son of the famous archaeological team of Louis and Mary Leakey.

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The Power of Environmental Knowledge
*Ethnoecology and Environmental Conflicts in
Mexican Conservation*

Nora Haenn

Introduction

In his summary of political ecology theories, Grossman described this diverse body of research as tending to emphasize how "agriculture and environmental change are influenced by state policy, regional trading blocs …, investments by transnational capital, penetration of the market, and the social relations of production" (Grossman, 1998, p. 18). Other researchers also suggest that the effects of power systems on environmental outcomes stem from the outcome of competing interests among various parties (Blaikie & Brookfield, 1987; Peluso, 1991; Schmink & Wood, 1987; Stonich, 1993; Stonich & DeWalt, 1996). While supportive of these approaches, this article also draws on recent work describing the importance of the meanings assigned to ecological systems (Escobar, 1999; Rocheleau *et al.*, 1996) to question how epistemological differences contribute to environmental conflicts. Following calls to examine the interface between environmental knowledge and action (Nazarea, 1999b, p. 7), consideration is given to ethnoecological constructs of forests in Campeche state on Mexico's southern Yucatán peninsula to explore how these constructs frame opposition to conservation activities.

Southeast Campeche is home to the Calakmul Biosphere Reserve, Mexico's largest protected area for tropical ecosystems. Declared in 1989, the Reserve's existence was communicated a year later to the 25,000 migrant, swidden farmers or *campesinos*, who now live in its buffer zone.[1] After an initial period of intense local opposition to the Reserve and newly imposed restrictions on subsistence activities (hunting, and burning and felling forests), government agents and farm leaders brokered a settlement in which farmers would receive increased economic aid in the form of sustainable development projects. Government aid calmed public expression of anticonservationist sentiment, while farmers privately continued to resist the application of conservation measures outside Reserve limits. In this resistance, farmers describe tensions

surrounding conservation as centering on competing class interests in resource control and on conflicting ideas regarding the government's appropriate role in land stewardship.

Farmers, urban dwelling environmentalists, foreign researchers, and local and national government agents all participate in ongoing negotiations regarding land use in and around the Reserve. In addition to the offices of government agencies, these negotiations take place in everyday places such as the restaurants of the region's administrative center and farmers' fields and homes where many sustainable development projects are carried out. Participants in these negotiations employ different meanings and definitions of Calakmul's environment. Often, these definitions are tangential to negotiations that otherwise focus on land use. Nevertheless, these categories frame environmental conflicts at Calakmul, and the following discussion explains how that is the case. In the conclusion of this article, the possibilities for alternative environmentalisms at Calakmul based on local ethnoecologies are explored.

The Setting

The Calakmul Biosphere Reserve encompasses 1,787,000 acres of seasonal tropical forests. Located near Mexico's borders with Guatemala and Belize, the Reserve connects with protected areas in these countries as part of a 5-million-acre extension of lowland forest (Mansour, 1995).

Researchers generally characterize southern Yucatán forests according to height and amount of leaf loss in the dry season (Table 21.1). As a seasonal tropical ecosystem, the Reserve and its 608,000-acre buffer zone experience markedly different dry and wet seasons.[2] Data show that on the average, rainfall in 1 of 4 years falls below 800 mm, creating drought conditions (Folan, 1991). Water shortages create particular difficulties for Calakmul's residents, who rely on rainfed agriculture and standing water sources.[3] During times of water scarcity, communities use water delivered from some of the region's larger lagoons. The author's 14 months of participant observation in Calakmul began in the fall of 1994, at the end of a drought year when many families required food aid to subsist. The following year, two hurricanes buffeted the region, flooding crops and forcing farmers to turn again to government relief for survival.

Although scientific descriptions provide an overview of Calkamul's ecology, much remains to be learned about the specifics of forest growth and regeneration at

TABLE 21.1
Tropical Forests of Calakmul Region

Type	Description
High evergreen	Canopy greater than 30 m
Medium semievergreen	25–50% leaf loss in dry season; canopy 15–30 m
Medium subdeciduous	50–75% leaf loss in dry season; canopy 15–30 m
Low semievergreen	25–50% leaf loss in dry season; canopy less than 15 m
Low subdeciduous	50–75% leaf loss in dry season; canopy less than 15 m

SOURCES: Boege, 1995; Ericson, 1996; Gates, 1993.

Calakmul. Throughout this century, the forests of southeast Campeche have been heavily exploited for forest products. During the 1980s, regional sawmills ceased operation because of a lack of harvestable timber. Botanical investigations of the region began in the early 1990s, at which time researchers encountered a forest lacking older trees. Photographs from the 1950s show taller trees of greater diameter than can be found today (Beltrán, 1958).

Current scientific understandings of Calakmul's environment are rarely communicated to the region's people. Instead, the governmental and non-governmental administrators of regional conservation and development projects tend to speak in generalities about the need to protect forests and prevent animal extinctions. These generalities are part of a larger picture in which competing, sometimes conflicting, ideas of the regional environment coexist.

Ethnoecologies at Calakmul

Because southeast Campeche is home to migrants from all regions of Mexico (Haenn, 1999), farmers use a variety of constructs to understand their new environment. However, despite their many differences, Campeche's farmers generally agree that the physical environment is a powerful entity, and a place of work.

The notion that the environment is a powerful entity is an analytical construct based on Milton's suggestions for reconsidering the way anthropologists understand how people conceptualize the environment. "As well as giving environments," she writes, "we might be able to identify passive environments, vindictive environments and so on" (Milton, 1996, p. 119). In accordance with this, Milton points to the existence of "non-industrial societies which do not recognize a human responsibility to protect the environment" (Milton, 1996, p. 133) because the environment as a force in itself lies outside the human domain. In these cases, the environment may be understood as powerful or having an independent vitality which challenges human ability to create a social order within it.

Spirits, known as *duendes* or *aluxes*, may live anywhere, but farmers associate them most commonly with forests and Mayan ruins. *Duendes* are tricksters said to carry away children lost in the forest. Farmers in one village described how a 3-year-old child became inexplicably lost for 2 days in the small woods immediately adjacent to her house. When the search party finally found her, she said her "brother" had cared for her during that time. Villagers believed this "brother" was a spirit.

Evangelical faiths have taken up the *duendes* as part of their proselytizing efforts. To counter syncretic Roman Catholic beliefs, evangelicals demonized *duendes* and, not coincidentally, reinforced the notion of forests as dangerous, asocial space. In their reconstruction of Genesis, evangelicals explained that when Satan was driven out of Heaven, he came to the Earth, and now lives in forests in the form of *duendes*. By accepting evangelical teachings, converts become immune to the power of *duendes*, although the spirits continue to lurk in the forests. Forest spirits are part of a larger depiction of forests as "ugly," untamed wilderness. Calakmul's farmers regularly

describe people who live in the forest as "dangerous." Forests are thus not only powerful, but can be essentially threatening to social order.

For many farmers, the power of forests lies in the way they "always grow back." Felling forests and farming are actions that bring land under social control, thereby limiting the forest's power. Attitudes toward this aspect of environmental power fall into two general areas. In the first area, people tend to see cultivated and wild plants as different ends of a continuum. Where cultivated plants now exist, weeds will take over, and eventually taller, secondary growth will emerge. Within this configuration, creating agricultural fields brings forests under human control only temporarily. Forest regeneration remains desirable because it enriches land for future farming.

In the second area, farmers view forests in direct opposition to cultivation and wealth. For them, the existence of forests marks the absence of productive activities, and they describe a need to permanently fell forest: "When I fell forests, it's for good." Before migrating, farmers in this group often had occupied positions in industrial agriculture. They came from areas in the states of Veracruz and Tabasco where large-scale deforestation in the 1950s and 1960s created landscapes with little more than patchy remnants of once extensive forests. For these farmers, a natural landscape is one that has been markedly modified by human activities. They tend to view the forest's power as predominantly negative.

In addition to the concept of a powerful environment, interviews conducted with 10 men of distinct state and ethnic origin elicited common themes of how the environment is a place of work. Fields are "where we work" (Murphy, 1998). Forests are future farmlands "where we're going to work." Interestingly, a separate category consisted of those places "where we cannot work," including protected areas and archaeological ruins (which Mexican law prohibits people from altering in any way).

Within this general framework, the men evaluated specific landscape features according to what kinds of work took place there in the past, and what possibilities that place offered for future work. Using forest height and tree diameter to measure length of time since a felling, they described the forest as being in one of three categories. *Acahuales*, or forest felled within the last 5 to 10 years, with immature trees having narrow trunks, require less work to clear and are preferred sites for future farming. The second category, *monte*,[4] is forest felled within approximately the last 10 years. The labor demands in felling *monte* obviously are greater, and in addition to the ubiquitous machete, farmers may need to use one of the few functioning chain saws locally available in order to clear land covered in *monte*, which is a secondary preference for future farming sites. The final category, *montaña*, is forest that farmers recognize as never having been felled. Without access to a chain saw, farmers must exert considerable labor in axing *montaña*, which makes it the least preferred site for farming.

Although a variety of local ethnoecologies has been distilled into two generalizations, in Calakmul's political arena this variety underwent further narrowing. Farmers and government agents translated the notion of environment as a place of work into an argument for sustainable resource use. This argument is explored in greater detail later. Here the focus is on the salience of an ethnoecology based on work in a region that is home to a diverse, sometimes divided, farm community.

Nearly all of Calakmul's current population have migrated to southeast Campeche in the last 30 years. Although most people moved from neighboring tropical states, at least 23 of Mexico's 32 states are represented. State of origin is an important identifier among farmers, as is affiliation with an indigenous group. However, despite this diversity, farmers are able to rally around their common identity as *campesinos*. Although *campesinos* are people who farm, the word also indicates a class identity. *Campesinos* are people who do not receive a regular salary. Their poverty makes them vulnerable to powerful outsiders. Farmers use this common identity, especially when dealing with government agents and urban and international environmentalists. As *campesinos*, they present a united front in pressing for access to various resources. Common understandings of the environment as a place of work coincide with a common identity based on subsistence farming. As farmers struggle to negotiate differences among themselves and between themselves and outsiders, this shared identity and ethnoecology are powerful tools for organizing messy social fields.

Contrasting Ecologies

Campesino land classifications are not that distinct from the scientific categories underpinning the Calakmul Biosphere Reserve. Both systems use forest height as a focal point for organization. At the same time, the systems exhibit two basic differences. Campeche's farmers understand forests as asocial places where people's proper role is to carry out subsistence work, and forest height marks past human activities. This contradicts the botanical categories circulated in policy and research papers on Calakmul, which generally depict forest growth from the perspective of an absence of human activity. In conservation settings, the notion that ecology is best understood without consideration of human activities often is translated into the concept that an ideal environment is one devoid of human presence (Hunter, 1996).

The second difference centers on the way the two systems conceptualize change over time. The idea that a healthy forest is one that achieves full growth potential with little disturbance tends to carry an additional understanding of short-term, engineered change as detrimental to ecosystem health. For Campeche's farmers, ideas of environmental quality vary with changing economies. Short-term changes in forest composition that meet current market trends make the most sense. In the long run, flexibility in access to a variety of resources is the most desirable strategy.

Because of the contrasts between these two environmental models, one might expect conflict in the application of conservationist ideas to land use in southeast Campeche. Indeed, farmers bristle against regulations that restrict hunting, swidden burns, and the felling of older growth forest. At the same time, they publically espouse environmentalism in order to cultivate financial aid in governmental and international circles. The following sections explore how this contradiction developed and, in particular, how farmers and certain government agents have promoted forest use under the mantle of sustainable development.

Environmental Conflicts at the Regional Council

Calakmul's first Reserve Director, Deocundo Acopa, described a broad division in the conservation community between those who support the sustainable use of resources and those who believe environmental protection requires a strict separation of people from protected areas. He characterized this latter position as the *no tocar* or "do not touch" approach. The debate between resource use and resource preservation in Mexico has documented connections with similar disagreements over the wise use of natural resources in U.S. conservation history (Simonian, 1996). As described by Acopa and members of Calakmul's farm community, this debate resonates with the knowledge systems outlined earlier. At the same time, advocates of the two positions occupy different positions of power, and, in general, those who promote preservation tend to have greater education and financial means than Calakmul's farmers (Deocundo Acopa, pers. comm., July 3, 1995). In this way, Acopa saw environmental knowledge as implicated in power systems. He was very interested in power structures and viewed his principal work as Reserve Director as managing competing interests to the benefit of both Calakmul's forests and its people.

Acopa's was the most influential government office in southeast Campeche, and he sponsored regular meetings in which representatives of regional farm organizations, nongovernmental environmental groups, and various government offices met to communicate (and, to a lesser extent, coordinate) their actions. In these meetings, Acopa usually was partisan to the positions held by regional farmers. Acopa was a nationalist and sympathetic to the *campesinos*' poverty. He saw farmer control of resources as part of a larger struggle for *campesino* self-determination. At the same time, on receiving his appointment to the Reserve directorship, Acopa was given the mandate to win Calakmul's inhabitants over to Mexico's ruling PRI party. In the words of one government agent, Acopa's job was to "get the politics in the palm of his hands." His partisanship in conservation was part of a larger goal of strengthening Partido Revolucionario Institucional (PRI) support in Calakmul.

Acopa had ample resources to use in addressing the dual agendas of conservation and electoral politicking. Soon after the Reserve's declaration, government agents representing the PRI quieted antienvironmentalist sentiment by offering a deal. In return for votes in a gubernatorial election, Calakmul's residents would receive increased development aid. Farmers agreed to this votes-for-development deal in 1991. Both the agreement and the subsequent development programs were couched in neopopulist rhetoric of self-help and personal empowerment. In a personal visit to the region, former Mexican President Carlos de Salinas charged farmers with "caring for the Reserve." In the following years, *campesinos* received programs aimed at both protecting standing forests and encouraging self-sufficiency in the farm sector. These programs included agroforestry, sustainable timber harvesting, organic agriculture, intensive cattle ranching, and wildlife management, among others (Acopa & Boege, 1998).

Although paid for with federal funds, the programs were administered by the Xpujil Regional Council, a farmers' organization supervised by Reserve Director Acopa. At the time of the author's field work, the Regional Council was a powerful player in southeast Campeche's political scene. The Council's budget rivaled that of

any government agency working in the region, and its programs reached into more than 40 of the 72 villages then located in the Reserve's buffer zone.

Council assemblies were a meeting ground of conflicting ideas about environmental management. During assemblies, village representatives met to oversee the work of the Council's board of directors. As many as 300 men and women attended the monthly meetings, making the Regional Council a natural place for disseminating government directives (e.g., on fire control during the burning season) or for cultivating support within the broader farm community.

At Council assemblies, Acopa encouraged farmers to take advantage of funding for environmental programs while elaborating his notion of conservation. Acopa described biodiversity as "diversity in use." He believed that if *campesinos* received financial gain by exploiting an array of forest resources, then they would be motivated to protect those diverse resources. Acopa simplified this idea into repeated admonitions that Council programs aimed to protect the environment so that people might use it.

Acopa pressured researchers and nongovernmental staff to request from the Council assembly permission to work in the region. He also demanded that researchers present their findings to the assembly. These presentations often occasioned responses meant to align research and development aid with local interpretations of the environment. For example, one foreign researcher presented his proposal to study jaguars through the use of radio collars. A number of farmers voiced an acceptance of this project based on the need to eliminate jaguars living threateningly close to community water supplies. Both the investigator and Reserve Director Acopa quickly explained that the research might have another use, specifically tracking jaguars for ecotourists who might photograph the animals.

Continued Resistance

Despite these [development] programs, farmers in southeast Campeche continued to resist conservation. Although their resistance had many sources, two points were particularly striking. One area of resistance was based in local ethnoecologies. If land is a place of work, then outsiders must have some kind of use in mind for the Calakmul Biosphere Reserve. Thinking along these lines, farmers viewed the goal of setting aside land that nobody would touch as a tactical manuever on the part of government agents and urban environmentalists who aimed to control forests for their own ends.

The second source of resistance lay in local ideas of government-farmer relationships. Mexico's federal government has depended on a social contract with peasant farmers to create the perception of legitimate federal rule (Hart, 1987; Nugent, 1993). This contract includes providing farmers access to land and support in the form of technological inputs and development projects. When Salinas charged farmers with "caring for the Reserve," he invoked this contract by offering symbolic ownership over the Calakmul Biosphere Reserve. Still, farmers recognized the difference between symbolic and actual ownership. They opposed programs that took land out of the agricultural base on grounds that such actions constituted a breach in their social contract with government authorities.

Although the ideal government-farmer relationship enables farmer livelihoods, Calakmul's farmers have learned that many government practices undermine subsistence. Consequently, farmers link conservation to endemic corruption among Mexico's ruling authorities. In 1995, government agents monitoring older-growth forest were ambushed on leaving a community under surveillance for illegal felling. The farmers involved murdered one of the agents. Although this event was reported in the urban press as an act of poachers, locally people viewed the murder as retribution, because the agents were rumored to be extorting bribes from peasants.

Basing their conclusions on such rumors of corruption, farmers surmise that environmental regulations contribute to more than competing interests in natural resource control. Such regulations also open a new field for illicit government activity. Therefore, when talking about the Reserve with one man, the author asked if he saw that animals were becoming extinct. The man replied, "No, the President invents these things, or he's taking advantage of something." Saying *somos tan desconfiados*, "we are so mistrustful," farmers repeatedly asserted a lack of confidence in government actions. At the same time, because conservationism opened new economic and political avenues, farmers were willing to use environmental issues to engage government agents (see also Haenn, 1998).

Rather than change local ideas of the environment, conservation projects provided farmers with new rhetorical tools for appealing to people interested in environmental protection. Astute farmers soon learned to mimic conservationist rhetoric publicly while privately continuing to operate within their previously held constructs. For example, Jerónimo explained to me that his village had distributed land to its members in such a way as to promote forest conservation. When asked just how the village's land distribution pattern (no different from any other in the region) encouraged conservation, Jerónimo could not answer. He had given the answer he thought I, who had arrived through the introduction of the Regional Council, wanted to hear.

Jerónimo participated in every sustainable development project offered in his community. He also sat on nearly every village committee overseeing these projects. Later I learned that although Jerónimo signed on for all projects, he followed through only on those he thought useful. For example, one year Jerónimo planted reforestation trees provided by the Council. The following year, on another Council project, he was able to plow his land with a tractor, a project that he was convinced would increase his harvest. With the Council tractor, Jerónimo plowed under the reforestation trees.

Jerónimo is one example of how farmers are wary of both environmental regulations and the benefits brought about by integration into conservation development programs. In this setting, farmers' notions of environment as a place of work take on political implications in the overall struggle to defend access to land. As farmers deal with the vagaries of an undependable government and marketplace, maintaining access to an environment in which they can work remains crucial to their livelihoods.

Conclusions

In calling for an ethnoecology that bridges knowledge and action, Nazarea (1999a) noted the importance of ethnoecologies as situated knowledge within overlapping power structures. The ethnoecology popularized and politicized by Reserve Director Acopa self-consciously mediated a division in knowledge and power between Calakmul's *campesinos* and urban and international elites.

Through the Regional Council and their alliance with Reserve Director Acopa, *campesinos* have promoted their notion of the environment as a place of work to counter preservationist ideas associated with the park model. Throughout my research, these two constructs had a symbiotic relationship such that one would hardly be mentioned without reference to the other. I came to question the interdependence of these two constructs. Could their pairing serve some purpose?

Since this research, much has changed in Calakmul. At the end of his tenure, Reserve Director Acopa moved to another site in Mexico's tropics. When its federal funding ended, the Regional Council received support from international donors for conservation development projects. These funds were not renewed, and the pervasive conservation development activities studied have ceased. Even at the height of conservation activities in 1995, policy makers had doubts about the programs' durability. They were unsure whether the programs, even if fully implemented, would actually result in continued forest cover and an increased standard of living for the region's families.

Given the tenuousness of conservation at Calakmul, I believe the connection between use and preservation served a variety of purposes. The opposing ideas provided latitude in which *campesinos*, government agents, and environmentalists could test both conservation programs and their respective strengths in shifting political fields. The opposition allowed farmers to take advantage of new subsidies while protecting their economic foundation in subsistence agriculture. In espousing both use and preservation, federal authorities appealed to conflicting interests among divergent constituencies. Finally, as scientific knowledge about Calakmul continued to accumulate, the opposition allowed policy makers to experiment with various conservation measures without forsaking any future path for protection.

Antienvironmentalism remains a powerful sentiment at Calakmul. In addition to their class critique of conservation, Calakmul's *campesinos* are aware that the tension surrounding resource management stems from the different ways in which people see the world. The material from Calakmul suggests that part of the political ecology of resource management lies in this intersection of power and knowledge. Calakmul's *campesinos* may have a more detailed awareness of divergent knowledge systems because environmental regulations and sustainable development projects force farmers to reckon with alien environmental categories. At the same time, the fact that a diverse body of local ethnoecologies has become distilled into the notion of environment as a place of work means that other possible areas for land use negotiation (such as aesthetic or cosmological considerations) are obscured. This distillation is not unusual. As Wolf (1999) has written: "ideas and idea-systems are often monopolized by power groups and rendered self-enclosed and self-referential" (p. 7).

The Regional Council's program raises questions about possibilities for a more localized environmentalism. Does an environmental ethic exist in the political strategizing and anticonservation sentiment with which Calakmul's residents approach conservation development? Johnson (1999) cited the need to examine antienvironmentalism as part of the overall project of environmental protection. His research into the formation of a U.S.-protected area at the turn of the century questions the extent to which positions labeled as antienvironmentalist may contain wilderness ethics at odds with those favored by professional environmental managers. Johnson describes a situation similar to Calakmul in which subsistence users came into conflict with local and urban elites who intended the park for tourism and sport hunting. According to Johnson's documentation, the latter environmental ideas won out over the former.

In my research, I met farmers opposed to conservation as described by government agents. They especially opposed government appropriation of land for parks, but nevertheless maintained part of their farm parcels as forest for hunting or for collecting some other forest product. It is possible that with continued funding, small-scale sustainable development projects would have provided a format for greater elaboration of a localized environmentalism at Calakmul. Given the economic insecurity of subsistence agriculture and the wariness with which farmers approach government agents, it would not be surprising if this environmentalism built on notions of work to stress political autonomy and secure access to natural resources.

NOTES

1. In 1996, Mexican authorities created the *municipio* of Calakmul composed of the Reserve and its buffer zone. A *municipio* is roughly equal to a U.S. county. In the following, the word "Calakmul" is used to refer to the area now within the *municipio's* limits, whereas "Reserve" signifies the Biosphere Reserve.

2. See Whitmore, 1990, on distinctions between tropical and seasonal tropical forests.

3. No permanent streams or rivers exist in the Calakmul region. The area's limestone base, typical of the entire peninsula, quickly absorbs rainfall.

4. *Monte* is the general term applied to any growth that is not directly cultivated by humans. Here I draw on one of the word's meanings as it relates to forest growth.

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Holding Ground

Kent Redford, Katrina Brandon, and Steven Sanderson

Conservation Clichés

"*The parks frontier is closed.*" According to the logic that produced this cliché, empty spaces are gone, so there can be no more parks created. But, increasingly, we realize that there was very little empty space to start with, and that parks and other types of protected areas have almost always been created on top of existing populations or areas used by someone. When this cliché is used, it is often in a hopeful sense—hopeful that the political will does not exist to generate new parks in areas occupied or claimed by people. Yet recent statistics show that the number and extent of protected areas created in 1990–94 exceeded that of any previous five-year period (WCMC, cited in *Oryx* 1997).

"*Empowerment of local communities will save more biodiversity than will parks.*" This cliché is based on the assumption that there is such a thing as local people who operate in a cohesive community fashion. All too often this is not the case (Agarwal, in press). As Borrini-Feyerabend (1996) states, "Communities are complex entities, within which differences of ethnic origin, class, caste, age, gender, religion, profession, and economic and social status can create profound differences in interests, capacities and willingness to invest in the management of natural resources." It is clearly not that communities are "bad" but rather that they must not be stereotyped. Some will actively work to conserve some components of biodiversity; others will not, and have not.

"*People have created biodiversity, so they are essential to its survival.*" As with many of these clichés, this one contains a grain of truth. Biodiversity is a social invention; people are its inventors as a meaningful concept. However, that does not mean that manipulation of biodiversity leads to its conservation. Furthermore, this cliché erroneously assumes that human influence in the selection of certain species and the structure of certain ecosystems has resulted in changes that would not be maintained in the absence of humans. It further incorrectly assumes that the sort of selection practiced by earlier human generations continues to be practiced by contemporary peoples.

"*Biodiversity per se can be both used and conserved.*" The term *biodiversity* has very frequently been appropriated from its biological roots by political actors less interested in conserving the biosphere than in who gets to use the biosphere, under what property rules, and with what allocation of the losses and gains from use (Sanderson and Redford 1997). As a result, it is used as a monolithic term in phrases such as this one, which ignore the fact that biodiversity has different components (genetic, population-species, community-ecosystem) and different attributes (structure, function, composition). Each one of these components and attributes is differentially affected by different types and intensities of human use (Redford and Richter 1998). Ignoring the complexity of the term allows the politically expedient conclusion that humans can both use and save "biodiversity." The power (and danger) of this cliché in the parks arena is demonstrated in a document produced from a meeting of representatives of the park systems of fifteen Latin American and Caribbean countries, which contains the statement, "Little by little it is being recognized that biological diversity must be simultaneously protected and used" (FAO 1994). This logic, from park authorities themselves, belongs in a looking-glass world, where use and conservation are the same. Its simplicity is betrayed by its evident denial of the need not to consume.

"*Parks must be viewed as resources.*" The previous cliché is echoed in this closely related one that directly addresses parks. This expression comes from a belief that the social value of protecting nature is not important in and of itself, and that parks must justify their existence in strictly economic terms. As Reid (1996) states, "The very name 'protected area' is a throwback to early conservation philosophy that viewed conservation as an alternative to development, not a component of development.... The term conveys the message that barriers exist between the resource and society." But it is exactly these barriers that were created by the society to maintain parks and their socially derived "non-resource" values.

"*Local people hate parks,*" or "*You have to choose between local people and parks.*" Ghimire and Pimbert (1997) state that "a growing body of empirical evidence now indicates that the transfer of 'Western' conservation approaches to the developing countries has had adverse effects on the food, security, and livelihoods of people living in and around protected areas." Despite this broad claim, the cases in this book and others (e.g., MacKinnon 1997) illustrate that parks and the organizations that support parks can bring strong benefits to local people, benefits that would not otherwise be made available to these people.

"*Because of use of the 'Yellowstone model,' parks are imperialistic impositions on third world countries.*" The argument can be made that land and the animals and plants it contains have been set aside from use by interested groups for many centuries in many parts of the world; from the Chinese and Persian hunting gardens to the sacred groves of India and West Africa. The New Forest in England has been a "protected area" since the twelfth century, although what it was designed to protect has changed from game through ship timber to wild nature (Heathcote 1994). The claim that national parks are a "rich-country institution" (Southgate and Clark 1993) is to deny inhabitants of other than rich countries the right to choose what options they would like to use in developing their own ways of life.

Conservation Generalizations

"*Parks may be ecological islands, but they are part of the social and political mainland.*" Parks are islands in some respects but clearly not in others. By generalizing their insular qualities, it is easier to use isolation as an excuse for economic integration. Acknowledging parks as part of a set of societal values allows them to be supported for what they are and not condemned for what they are not.

"*Ignore history at your own peril.*" Understanding the biological and social history of a given site, together with the political circumstances surrounding its creation, is essential in creating feasible conservation programs. As Brandon points out, the circumstances of origin create significant phylogenetic or design constraints that can strongly influence the success or failure of conservation actions at a given site. Standardized approaches must be used as the raw material from which to tailor locally appropriate, enduring conservation solutions.

"*Ignore scale at your peril.*" Each site is linked to regional, national, and international scales through agricultural, trade, and colonization policies and the politics of conservation, development, and local peoples. These connections can interact with one another and create conditions that impact threats, partnerships, and policies. Moreover, there is no "right scale," but a set of cross-scale dynamics important to biodiversity. When crafting local approaches, it is vital to understand the proximate and ultimate driving forces that have influenced and will continue to influence conservation actions.

"*Work at protected areas needs to concentrate on alleviating threats to the biodiversity components that the site is designed to protect.*" Much work has been done at sites that is not directed specifically at ensuring the long-term conservation of those things that the site was established to conserve. Much of the work at integrated conservation and development projects has not clearly linked development activities to specified conservation objectives and has therefore not guaranteed conservation outcomes (Wells and Brandon 1992). In fact, some inappropriately focused development activities have resulted in "death by friendly fire"—the destruction of that which they were designed to preserve. Without being precise about the purposes of a given conservation area, it is difficult to develop appropriate conservation actions (Weeks 1997).

"*NGOs can be effective agents for conservation.*" NGOs can navigate the constantly shifting terrain between nature, local people, nonlocal people, national governments, multilateral organizations, and other NGOs. They can bring attention and resources to help protect a given site and to help ensure that people living near the site receive government services. Though the terrain is slippery, they can fulfill functions of national governments in ensuring the long-term survival of national patrimony.

"*Parks cannot be conserved without national governments.*" All too often the role of national government is neglected, yet it is within the network of national policy and politics that parks must exist. Neglecting this fact can only risk failure. All too frequently the rhetoric surrounding parks has focused on local people and international actors, failing to focus on the vital role, good and bad, played by national governments.

"*Be prepared for creative partnerships,*" and "*Look for the charismatic leader.*" Common goals can make for uncommon partnerships. The Parks in Peril program has

created a means for different constituencies with sometimes conflicting agendas to find common ground. This common ground and the desire to locate it has frequently been catalyzed by self-selecting individuals who can emerge to play vital roles in crafting enduring solutions.

"*Conflicts are not constant, but parks must be.*" Conflict concerning a given protected area shifts over time, involving different threats, different interest groups, and different social values. When developing ways of resolving these conflicts, it is vital to understand these shifting contexts and not compromise the long-term viability of the park itself under the belief that resolving a given conflict will provide an eternal solution.

"*Stereotypes are fatal to new solutions.*" Nonconformity and the possibility of unexpected solutions are frequent surprises. These may arise from unexpected people, unexpected coalitions, unexpected agencies, and novel circumstances. The case studies have in common the unexpected solution and the openness to explore the unexpected. Stereotypes and clichés serve only to prevent recognition of novelty.

Conclusion

The biodiversity that parks are designed to protect is a social good. Many of the parks in Latin America and the Caribbean were created in the 1980s, before the decade of biodiversity—the 1990s. The anomalous nature of the term *biodiversity* has contributed to the criticism that parks are not achieving their mission, and its increasing adoption worldwide has led to an expectation that parks were designed to save "biodiversity." Yet this term is essentially a political one whose appropriation by politically interested actors has led to a significant critique of national parks (Sanderson and Redford 1997).

Yet the pressure remains inexorable on parks, a meager 5–10 percent of the earth's surface. Parks have become the stage on which many demand action to redress rural poverty, social justice, gender inequity, and the plight of indigenous peoples. Parks are also supposed to be the testing ground for sustainable development and compatible resource use. The strident voices of critics the world over condemn parks for not solving many of the ills accumulated over centuries of capitalist excesses. Why are these critics focusing on parks and not on the 90–95 percent of the rest of Earth's land surface? Is it because they are unable or unwilling to make demands of the powerful groups that control the destiny of this vast majority of the earth?

The Parks in Peril program is a feisty, creative middle ground. It is true that parks may have been created by "top-down" forces, but that is the only way they could have been created. "Bottom-up" in situ efforts have created systems of sacred groves and sacred forests but nothing of a scale sufficient to preserve large portions of ecosystems. But top-down efforts will never ensure the conservation of a place that they have succeeded in creating. For this, the good will and enthusiasm of local forces are essential.

We stress that parks are necessary, but not sufficient, for biodiversity conservation. They must be seen as part of a national, regional, or ecoregional scheme that will

comprehensively and effectively address biodiversity conservation issues in parks as well as outside of parks. Park-based conservation must be integrated with conservation efforts focused on agriculture, forestry, grazing, pollution, water diversion, and urban areas. Parks may be jewels in the crown, but they will not survive in isolation. Parks aren't a failure any more than they are a success. They are a hope, a hope to be realized at single sites where a scientific understanding of biodiversity is married to the management of human progress and dignity. They are a reflection of the human desire to not completely destroy that which sustains us. Park advocates and park managers must work in close alliance with others trying to ensure a compatible future for humans and their societies, along with the myriad other species and systems inhabiting the earth.

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Does Biodiversity Exist?

Arturo Escobar

Does "biodiversity" exist? Is there a discrete reality of "biodiversity" different from the infinity of living beings, including plants, animals, microorganisms, homo sapiens, and their interactions, attraction and repulsion, co-creations and destructions? Foucault (1980) suggested that "sex" does not exist, but that it is an artificial construct required for the deployment of sexuality as an historical discourse. Is biodiversity similarly the construct around which a complex discourse of nature is being deployed? If this is so, then, as in the case of sexuality, the biodiversity discourse would anchor an entire apparatus for the dispersion of new truths throughout vast social domains.

From a biological standpoint, one could say that biodiversity is the effect of all this natural complexity, and that it could thus be specified in functional and structural terms. In fact, the current scientific approach to biodiversity is geared not toward "theorizing biodiversity" per se but towards assessing the significance of biodiversity loss to ecosystem functioning, and to ascertaining the relation between biodiversity and the "services" ecosystems provide.[1] Established definitions of biodiversity do not create a new object of study that is outside of the existing definitions in biology and ecology.[2] Rather, "biodiversity" is the response given to a concrete situation that is certainly preoccupying but which goes well beyond the scientific domain. As critical studies of science have shown, the act of naming a new reality is never innocent. What views of the world does this naming shelter and propagate? Why has this new way of naming been invented at the end of a century that has seen untold levels of ecological destruction?

From a discursive perspective, then, biodiversity does not exist in an absolute sense. Rather, it anchors a discourse that articulates a new relation between nature and society in global contexts of science, cultures, and economies. As a scientific discourse, biodiversity can be seen as a prime instance of the coproduction of technoscience and society that STS scholars analyze in terms of networks.[3] Technoscientific networks are seen as chains of sites characterized by a set of heterogeneous parameters, practices and actors. Each actor's identity is affected by, and affects, the network. Intervention in the network is done by means of models (e.g., of ecosystems,

conservation strategies); theories (e.g., of development, restoration); objects (from plants and genes to various technologies); actors (prospectors, taxonomists, planners, experts); strategies (resource management, intellectual property rights); etc. These interventions effect and motivate translations, transfers, travels, mediations, appropriations and subversions throughout the network. Although local practices might have extra-local origins and consequences, each site can be the basis of its own network.

The biodiversity network initially originated in the late 1980s and early 1990s out of conservation biology, where "the idea of biodiversity" (Takacs 1996) first flourished. It soon articulated a master narrative of biological crisis ("if you want to save the planet, this is what you must do, and here are the knowledge and resources to do it") launched globally at what has been called the first rite of passage to the "transnation state," the 1992 Rio Summit (Ribeiro 1997). According to actor-network theory, the biodiversity narrative created obligatory passage points for the construction of particular discourses. This process translates the complexity of the world into simple narratives of threats and possible solutions. The aim was to create a stable network for the movement of objects, resources, knowledge, and materials. This simplified construction was perhaps most effectively summarized in Janzen's moto about biodiversity: "you've got to know it to use it, and you've got to use it to save it" (Janzen and Hallwachs 1993). In a few years, an entire network was established that amounted to what Brush (1998) has aptly called a tremendous "invasion into the public domain." Yet the biodiversity network has not resulted in a hegemonic and stable construction as in other instances of technoscience. Countersimplifications and alternative discourses produced by subaltern actors also circulate actively in the network with important effects.

The biodiversity discourse has thus resulted in an increasingly vast institutional apparatus that systematically organizes the production of forms of knowledge and types of power, linking one to the other through concrete strategies and programs. International institutions, Northern NGOs, botanical gardens, universities and research institutes in the first and third worlds, pharmaceutical companies, and the great variety of experts located in each of these sites occupy dominant sites in the network. As they circulate through the network, truths are transformed and re-inscribed into other knowledge-power constellations. They are alternatively resisted, subverted, or recreated to serve other ends, for instance, by social movements, that become, themselves, the sites of important counterdiscourses. The network is continuously transformed in light of the translations, transfers, and mediations that occur among and across sites. Such sites are more than "local" places strictly speaking, and are defined by processes that take place within the network, where the boundaries of technoscience and other domains are never stable.

NOTES

1. The SCOPE (Scientific Committee on Problems of the Environment) Program on Ecosystem Functioning of Biodiversity, and the United Nations Environment Program's Global Biodiversity Assessment Program follow this approach. See SCOPE's technical volumes and the useful review of the project in Baskin (1997).

2. Article 2 of the Convention on Biological Diversity, for instance, provides the following definition: "'*Biological diversity*' means the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems." This definition has been further refined by the World Resources Institute (WRI) as comprising genetic diversity, the variation between individuals and populations within a species, and species and ecosystems diversity, to which some also add functional diversity.

3. In its "classical" formulation, the actor network theory was proposed by Callon and Latour as a methodology to study the coproduction of technoscience and society. It has been refined and transformed since by anthropologists of science and technology such as Rayna Rapp, Emily Martin, Deborah Heath and Donna Haraway.

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Road Kill in Cameroon

Michael McRae

Red dust coated everything in Otoumoukad: the thatch-roofed huts, the drying laundry, the neatly tended plots of cassava and maize, the jungle greenery crowding in on all sides. The little roadside settlement lay deep in the tropical forest of southeastern Cameroon, near the frontier with the Central African Republic. By 9:00 A.M., the air was already heavy with humidity. Each time another logging truck rumbled past, clouds of dust as fine as talcum boiled up from the road and drifted over the village.

Swiss photographer Karl Ammann and I had driven to Otoumoukad that morning after hearing rumors that someone in the village had a baby gorilla. Along with us were Reinhard Behrend, of the German rain forest group Rettet den Regenwald (Save the Rain Forest); our translator, Celestin Bitongolo Nkou; and Alfred, our lead-footed driver, who sped off in search of the car's grill, which had shaken loose on the rough roads.

The rumors proved correct. We found the infant gorilla cowering in the corner of a dark, one-room mud hut, grinding its teeth and straining against its tether. The owner explained in French that its parents had been shot two weeks earlier by a village hunter. The male had been wounded as it charged in self-defense but had managed to flee. The female died clutching her baby. She was then field dressed, packed out of the bush, cooked, and eaten. Her baby was being kept as a pet or possibly for sale to a passing trucker.

Ammann and I had arrived in Cameroon a week earlier to attend an upcoming conference on the growing commerce in "bushmeat," as game meat is called, and the role that the logging industry plays in facilitating the trade. The conference was to be held in a week's time in Bertoua, the capital of Cameroon's eastern province. With time on our hands, we had planned a foray to the frontline of the bushmeat business. After meeting Behrend in Yaoundé, the country's capital, we had taken the night train to Bertoua and the next day hired Alfred to take us south and east to Yokadouma to visit a logging concession. It was there we had heard about the orphan in Otoumoukad.

The traumatized eighteen-month-old baby was obviously close to death. "*Il est meéchant*," the owner cautioned us: "He's mean." Not surprisingly, the baby had nipped him several times. Behrend and I took a step back, leery that gorillas, like

chimpanzees, might harbor the Ebola virus. Two months earlier, thirteen villagers in Gabon had succumbed to Ebola after feasting on a dead chimp they had discovered in the forest. Investigators later found two dead gorillas near the village and were warning people in Gabon not to touch any dead animals or to shoot any game animal that was behaving strangely. The isolated outbreak had occurred less than 200 miles from where we were.

Ammann reached down to stroke the terrified infant, uttering a series of throaty pacifying vocalizations—"eh, eh, eh." The baby bared its teeth but instead of attacking hid its face behind upraised arms.

"That is one of the most distressing sights," said Ammann, emerging from the windowless hut into the blinding equatorial sun. The scene was all too familiar to him but still profoundly disturbing. In eight years of documenting the bushmeat trade in central and West Africa, he had encountered scores of orphan apes in similar straits: the unfortunates who had survived a hunter's shotgun blast and hadn't ended up in the pot themselves. Some he had managed to deliver to animal orphanages; most were doomed to live as pets—at least until they perished from malnourishment, disease, or depression. Freeing an animal into the wild is not an option, as an orphan cannot fend for itself.

"This one will live only a few more days," Ammann said, wiping the sweat and dust from his face. "Chimpanzees have the will to live if they're separated from their family, but gorillas fall into a depressive state and just give up on life." The baby's only chance of survival lay in transporting it to an animal sanctuary.

Next to chimpanzees, gorillas are our closest relatives. But the kinship of apes and humans did not, by itself, explain the depth of Ammann's anguish. In 1988, he and his wife, who live in the Kenyan highlands, had acquired a chimpanzee from a riverboat trader in Zaïre. The once sickly bushmeat orphan had blossomed into a robust, animated, playful adolescent, and Ammann dotes on him as he would an only child. As a surrogate parent, Ammann has gained insights into the nature of apes—and a compassion for them—that only someone who lives with animals can.

Adopting a chimpanzee changed the course of Ammann's life. A photographer whose work has resulted in three books on African predators and one on great apes, he undertook a crusade "to get the public riled up" about the growing commerce in bushmeat—specifically the meat of western lowland gorillas and chimpanzees, but also of such protected species as elephants, giant pangolins, and mandrills, rare baboons with vivid scarlet-and-blue facial markings. After eight years of trekking through West and central Africa, often enduring miserable conditions, he considers himself to be the world authority on bushmeat. "There are people who are experts in their own countries," he asserts, "but as far as range, no one has done the kind of investigating that I have."

He is utterly consumed by his cause. Blunt, impatient, and obstinate, he confesses to being a "loose cannon" among wildlife conservationists.

"Maybe I've become too extreme," confesses Ammann. "But let me take my message to the public: we are treating our closest relatives like pieces of protein."

Gorilla and chimpanzee meats have long been esteemed in many central and West African cultures for their flavor and spiritual and nutritional value. But in remote

forests where indigenous people used to hunt and trap sustainably, market hunters are now snaring and shooting every creature that walks, crawls, or flies.

"I have seen them selling fish eagles, bats, palm grubs, turtles, crocodiles, monitor lizards—anything that is protein," says Ammann. "In a hunting camp, I was once offered grilled African gray parrots to eat."

The demand for bushmeat is driven by numerous economic and cultural forces, but the supply, according to Ammann and other investigators, depends on one key factor: logging. Were it not for the expanding network of logging roads, hunters would not have such easy access to virgin hunting grounds or a convenient way to get their meat to market. Game that they preserve by smoking is picked up regularly by traders, or it moves on the steady stream of trucks hauling timber for export. Some of this meat is sold locally to loggers and villagers, but the engine of the bushmeat business is the urban consumer. Indeed, supply lines are so well established that in Yaoundé, Cameroon's capital, people can dine out on gorilla or elephant or, according to Ammann, order it for special occasions and receive home delivery, just like Christmas turkey. Notwithstanding his obsession with the subject, I found—after three weeks of traveling among Cameroon's major cities, villages, hunting camps, and jungle outposts like Otoumoukad—that very little of what Ammann told me was overstated.

For his part, Behrend had joined us to get a firsthand look at the bushmeat trade. But he was also looking for an issue to ignite public opinion against unsustainable logging—the "Chernobyl of the tropical timber trade," as Ammann put it. Behrend thought that bushmeat—or more precisely the plight of orphan apes—might be just the issue. After seeing the baby gorilla in the hut, I had little doubt that he was right.

When we met Behrend in Yaoundé, he had struck me as a character straight out of a Joseph Conrad novel. He was wearing a food-stained shirt, trousers with ragged cuffs, and a three-day stubble. But he was warm and articulate—and as passionate an advocate for the rain forest as Ammann was for apes. The three of us rolled out of the Yaoundé train depot at 5:00 P.M. in a first-class club car so thick with cigarette smoke that you could almost carve your initials in the air.

It was after midnight when we arrived in the town of Bélabo, which was pitch black except for the lights of the police station. We went straight there to report being robbed. A washed-out bridge halfway to Bélabo had forced us to disembark from the train and walk a mile to the opposite side of the break, where a second train awaited us. It was on this trek—swept along by a tide of jostling, shoving, yelling passengers—that light-fingered thieves had lifted a Nikon F4 from Ammann's camera case and our train tickets from my shoulder bag. It looked as though our trip was going to be a rough one, which was just Ammann's style.

The duty officer at the station was brusque and irritated. His pistol and a scattering of bullets lay conspicuously atop his desk. As Ammann explained about needing a copy of the robbery report for an insurance claim, you could hear the wheels turning in the policeman's head. Rather than taking a statement, he announced that he was fining us 5,000 francs, or about $10, for traveling without tickets.

Ammann was not about to submit. Sometime around 1:00 A.M., the constable saw that it was hopeless. He suddenly remembered some urgent business and swept out of the station, directing his assistant to take a statement.

This gutsy, aggressive style has served Ammann well, but it has also resulted in tense moments. In Cameroon last year, with two television crews in tow (from the BBC and Britain's Channel 4), he asked the Ministry of Environment and Forests to seize an orphaned chimpanzee pet and deliver it to the Limbe Zoo and Wildlife Reserve Center on Cameroon's coast. Ammann and armed rangers from the ministry descended on an amusement park near Yaoundé to confiscate the chimp. But the influential park owner alerted a highly placed—and armed—friend that a foreigner had stolen his chimp and was trying to smuggle it out of the country.

Ammann was sitting alone in back of a car with the chimpanzee when the armed man accosted him. When Ammann refused to release the animal, the man drew his pistol and threatened to shoot them both. The day was saved when the rangers, cocking their rifles, came charging out of the ministry building and chased the man off.

"That was something I don't want to go through again," says Ammann. "But the incident gave us credibility as people of action, rather than some guys sitting in their office making promises that are never kept." It also persuaded the amusement park owner that WSPA was well intentioned. He has since offered to donate land for an ape sanctuary provided that WSPA builds the facilities, which it is considering.

Ammann's main purpose for traveling to Bertoua and beyond was to speak at the bushmeat conference, which WSPA was cosponsoring with a Cameroonian group called Enviro-Protect. Every major logging operator had been invited to the conference, along with national and provincial officials, conservationists, nongovernmental organizations, and law enforcement authorities. The conference was a milestone, for it marked the first time that the connections between the bushmeat trade and the logging industry would be addressed in such a public forum in Africa.

For Ammann and WSPA, the seminar was evidence of their campaign's effectiveness. At a presentation to a European Parliament committee in December 1995, he and WSPA's directors distributed a graphic sixteen-page brochure entitled "Slaughter of the Apes: How the Tropical Timber Industry Is Devouring Africa's Great Apes." Illustrated by some of Ammann's most disturbing photographs, it depicted severed gorilla heads on the forest floor, chimpanzee arms blackened and contorted from smoking, and one heart-rending image of a half-dead orphan gorilla lying in a filthy suitcase for transport.

At a subsequent meeting of Afro-Caribbean-Pacific nations and the European Union, 140 delegates passed a resolution urging action, a move that reportedly embarrassed Cameroon's highest leadership. The Bertoua conference was approved not long afterward. But whether the government was genuinely concerned or just paying lip service remained to be seen.

The region we were entering was once among the largest expanses of rain forest in central and west Africa. To the south and east of Bertoua lay a great basin of forest and swamp drained by the Sangha and Ubangui Rivers, which feed the mighty Zaïre. My well-worn Michelin map indicated that the area abutting the Sangha was mostly

wilderness. It appeared as a broad field of green uncluttered by roads and place names and was enticingly labeled *Pygmées*.

But the map was dated. In the eighteen years since its publication, the contiguous forests of Cameroon, Congo, Gabon, and the Central African Republic have increasingly come under siege by battalions of *chasseurs*, or "hunters," and chainsaw-wielding *abatteurs*, a word that translates as either "tree fellers" or "slaughterers." Hundreds of tiny settlements have sprouted up since 1978, established villages have doubled or tripled in size, and a network of bulldozer tracks had penetrated the green void on my map.

Still, the region's extreme isolation has afforded it some protection. The expense of building roads and transporting logs to market dictates that only the most valuable hardwoods can be profitably exploited, species with such lyrical names as *ayous, moabi, sapelli*, and *wengwe*. Such selective logging of the most desirable trees is not automatically detrimental to wildlife. Research in Zaïre and the Central African Republic suggests that gorillas may actually find more of their favored foods in moderately disturbed forests than in virgin ones. Similarly, in Uganda, blue monkeys and black-and-white colobuses thrive in selectively logged forests, because the fruiting trees that they prefer tend to colonize a regenerating habitat.

Where logging is heavy, animal populations fall into steep decline. But in the remotest jungles of West Africa, habitat loss is less of a concern than is hunting pressure. That is the conclusion of a 1991 report on the Sangha region of Congo, just across the border from where we were heading. There researchers discovered that the population of primates in one selectively logged concession was "exceedingly low."

"We believe this is not a direct consequence of canopy reduction," wrote principal author David S. Wilkie, of Tufts University, "but results from the extremely intensive market hunting that coincides with timber surveying and extraction." The study predicted that the combined effect of logging, market hunting, and an ever-growing demand for bushmeat by urban dwellers would have "grave consequences" for the region's wildlife.

Large animals affect the forest's structure as well. "Gorillas are the gardeners of the rain forest," says Purdue University anthropologist Melissa Remis, who has studied gorilla ecology in the Central African Republic. "They actively prune trees when they're foraging, which shapes the habitat in ways that aren't fully known." Belgian agroforester Pauwel De Wachter, who studies hunting and shifting agriculture in Cameroon's Dja Faunal Reserve, explains that elephants play a similar role. Because of the amount of food they eat and the distances they range, their removal, says De Wachter, "would have a huge impact on biodiversity."

The Dja reserve contains an estimated 2,000 gorillas and 1,000 elephants. Those and other endangered populations could crash within the decade, De Wachter believes, unless income-producing alternatives to market hunting are introduced. These might include initiating agricultural and ecotourism projects, paying the villagers to survey animal populations, and giving the hunters jobs as antipoaching game wardens.

"Hunting need not be a negative force," says De Wachter. "Subsistence hunting will always exist, but if it is done sustainably it is not harmful."

Gauging the impact of market hunting on particular species is an imprecise science, a matter of comparing estimates of population size to estimates of the numbers of animals killed. Consider the western lowland gorilla, a species so cryptic that Remis went three years without ever getting closer than sixty-five feet to her study group when they were on the ground. An extrapolation of a 1985 census in Gabon puts the total western lowland gorilla population at 100,000 (outnumbering the mountain gorilla by a factor of 100). But Remis challenges the figure. "Many of us think it's too high because of deforestation and agriculture," she says. "I think 50,000 is a safer figure."

If gorilla population statistics are open to debate, those on hunting pressure are downright vague. Ammann believes that the number of lowland gorillas killed "must be measured in the thousands." After his 1995 reconnaissance of southeastern Cameroon's Kika–Moulundu–Mabelele triangle, he estimated that 800 gorillas were being killed annually in the 6,000-square-mile area. But his calculations involve much guesswork and extrapolation; they're based on hearsay about hunting success rates and on shotguns in use.

To trace the flow of meat leaving one concession in the Sangha region. David Wilkie's team went to a tract being logged by the Société Forestière Algéro-Congolaise. The daily routine began at dawn. Leaving for work, the loggers picked up a BaNgombe hunter and gave him a shotgun and three cartridges. The arrangement was that if the hunter bagged three animals, he could keep one. The man hunted all day and in the evening was driven to a village where his kills were smoked for shipment. A Société truck making the rounds to villages collected the meat, which was taken by pirogue across the river to Cameroon or downstream to Ouesso, the commercial nexus of northern Congo. From there, bags of bushmeat were loaded on commercial flights to Brazzaville or, in Cameroon, transported on logging trucks. In addition, loggers returning home to cities would bring bushmeat to families and friends nostalgic for the country life and the evocative flavor of game.

Two years ago in Ouesso, an observer for the Wildlife Conservation Society documented an average of 12,500 pounds of bushmeat moving through the city's markets each week. Duiker was the most prevalent, but also on sale were seven species of monkeys, eight other species of antelope, chimpanzees, elephants, and gorillas (an average of 1.6 per week). A market survey in Gabon put urban consumption of bushmeat at four million pounds a year and about the same in rural areas. Two gorillas and three chimps were openly displayed that year in one of the markets monitored, but more meat was likely being sold under the counter, as both species are technically contraband.

The notion of finding gorilla or chimpanzee on sale was macabre but fascinating to me, and I had resolved to conduct my own informal market surveys as we moved across Cameroon. In Yaoundé, with the train service interrupted, the pickings had been slim at the bushmeat market near the depot: only a few smoked monkeys, a live baby crocodile, a turtle, and a primate of some sort, charred black and cut lengthwise, with half its face frozen in a hideous grimace.

Not until Bertoua did I find what I was looking for. Strolling the aisles of the bushmeat section in the city's sprawling bazaar one morning. I came across a vendor

selling smoked gorilla meat and doing a brisk business. "The animal came from around Yokadouma," she explained, whisking away the flies. The meat was butchered and unrecognizable as gorilla, but it smelled appetizing, something like smoked lamb or beef, and was very lean. A mound of chunks weighing five ounces cost 250 francs (about 50 cents).

The price was the same as for porcupine, python, giant pangolin, and monkey available in nearby stalls. I found that puzzling. If gorilla was such a delicacy, why wasn't it priced accordingly? (In Yaoundé, Ammann had told me, it was twice the price of beef.)

"My customers don't express a preference for gorilla," the woman explained. "They buy whatever I have to offer. To them it's all just meat."

We had not slowed down since arriving in Cameroon. Ammann's pace and stamina were superhuman. He led us on a fifteen-mile forced march through the jungle to see an orphan chimp in a village just outside the logging tract, only to find that the animal had died the week before. And until we learned about the orphan gorilla of Otoumoukad from Pierre's men, he had been insistent about going off on another trek to find a band of hunters who had recently speared an elephant.

"Karl," Behrend told him in a steady voice, "you have to set your priorities. You can't do everything in one life."

When we reached Otoumoukad and saw the pathetic baby gorilla in the dark hut, Ammann quickly put aside his own distress. He ran outside, loaded his cameras, and plunged into the hut again. The infant was still grinding its teeth and hiding its face, but it was now slumped on its side. It appeared to have suffered a dislocated hip or broken leg. The only hope was to try to get it to the Limbe Zoo, which was 400 miles away.

Alfred, our driver, returned just then, beaming about having located the car's missing grill undamaged. We all jammed into the car, with Behrend in the back seat cradling the gorilla, and drove off in a swirl of dust. Back at our camp, we fed the baby condensed milk and bananas, zipped him into the hammock, and with all the village children following us, repaired to the nearby river for a swim. It was the first time we had relaxed in two weeks.

That night, the villagers staged a joyous celebration of song and dance. The revelry went on until 2:00 A.M. In the morning we trekked back to the stockyard with the gorilla, whom we had named Boumba after the river. Pierre agreed to keep him until someone could fly out from the Limbe Zoo.

Boumba seemed much improved, and the villagers were treating him with tender solicitousness. That was a remarkable change for them. "If I had seen that animal a week ago," our guide confessed sheepishly, "I would have killed and eaten it." Now he was handfeeding Boumba like his own baby, carefully blowing on bits of boiled cassava to cool it. We left Boumba zipped in his hammock, bright-eyed and gnawing on a baguette and a banana amid the pandemonium of rumbling skidders and screaming chain saws.

During our three days in the logging concession, we had seen little evidence of commercial hunting—no hunting camps and only one hunter carrying four white-nosed

guenons that he hoped to sell to a bush restaurant. Even the locals were not having much luck finding prey because of the racket caused by the logging operation.

The situation at our next stop, the market hunters' camp, was markedly different. It had taken another ten torturous hours of driving to get there. Ammann and I parted company with Behrend at the camp, sending him on to Yaoundé with Alfred, who would return for us in two days.

We were now about three hours south of Bertoua, deep in a logging concession run by the giant French concern Société d'Exploitation des Bois du Caméroun. Eight mud-and-wattle shacks flanked an abandoned logging track, chickens scratched in the dust, and dogs sniffed piles of garbage. Twenty people lived there. The chief hunter was a thirty-seven-year-old named Joseph Melloh, who spoke English so rapidly I could barely understand him. He had tried to earn a living as a storekeeper and a gasoline smuggler, but poverty had forced him back to the bush to hunt.

"In school I read the diaries of Mungo Park and *The Adventures of Huckleberry Finn*," he explained. "I thought if these men can have their adventures, I can have mine too, so I came here." Hunting was a pure life (he neither smoked nor drank) but not an easy livelihood. When he first came to the concession in 1984, he was the only hunter; a dozen years later, more than 200 men were competing for his turf. In a good week, hunting hard, he might earn 50,000 francs, or about $100.

"Today we will go to the forest for our adventure!" he said brightly in the morning. We set out with an apprentice hunter, Jean-Riche, who carried a handsome, French-made 12-gauge shotgun, one of two that Joseph leased for about $5 a week. Joseph carried just three cartridges, two of them chevrotines. "Today we will find gorilla," he said.

Gorillas are by far the preferred prey because of their weight. Smoked, each is worth about $40, whereas a chimp might earn $20, and a monkey, about $5. "People like gorilla very much," Joseph explained. "It tastes sweet like elephant and monkey. At Christmas, my customers want gorilla so much."

Apart from its festiveness, gorilla meat is reputed to have potent spiritual qualities. "If you and your wife eat it from the time that she becomes pregnant," Joseph continued, "the baby will be smart enough to go to university. Some people will dry the gorilla's hand, grind it up into powder, and put it in the baby's bathwater. Then the child will grow up to be strong."

We followed a path for two miles, three, four. Jean-Riche stopped at one point and made a popping sound by clapping his palm over his pursed lips to lure a gorilla. Again no luck. Trooping deeper into the forest, I gave up any thought of seeing gorillas. There were no signs of them anywhere.

Suddenly, Joseph froze. A commotion of chattering drew his attention. He motioned for us to stay put. He and Jean-Riche slipped off their shoes and waded into the bush. Moments later, another boom, then silence. When the pair returned, Jean-Riche proudly showed his kill: a gray-cheeked mangabey, shot dead between the eyes.

I kept my distance as we trekked back to camp, watching the blood drip from the monkey's wounds onto Jean-Riche's badly scratched legs. Sooty mangabeys are a reservoir of a retrovirus called SIV sm, which is related to HIV-2 and which was probably transmitted to humans through blood exposures of the sort that occur when hunters butcher meat—or carry dead mangabeys. (A strain of HIV-1 called Type O,

first seen in Cameroon, may have emerged in a similar fashion but from chimpanzees.)

Joseph's ankles were badly swollen when we reached camp. Some days he walks thirty miles, then hunts by night as well, spotlighting prey with an improvised headlamp. Ammann estimates that the camp has claimed 200 gorillas in the past three years. It also runs three traplines that catch everything from pangolin to duiker to leopard. One leased shotgun reportedly was used by several hunters to kill eleven elephants. But on this day, Joseph's and Jean-Riche's return for six hours of walking was one mangabey, worth perhaps $5.

I was greatly relieved to leave the desperate atmosphere of camp and return to Bertoua for the bushmeat conference. The meeting was well attended, except by loggers, who boycotted it. Ammann and the WSPA came under fire for the "Slaughter of the Apes" brochure. "When Europeans read this, I would not be surprised if Cameroon's timber is banned," said Dieudonne Nguele, the provincial representative of the Ministry of Environment and Forests. "The timber industry is a key source of income at this stage in our development. If there is a ban, what will replace this industry?"

"If we ban bushmeat, we will help the animals but harm people who have no alternative," said Nguele, voicing a prevalent opinion. "Sometimes a government must close one eye." He had showed the WSPA brochure to his father, who responded, "What the hell am I going to eat? What about the people?"

That was Joseph Melloh's question, too. Ammann had invited him to Bertoua to discuss "Project Joseph," a plan to start a gorilla ecotourism outfit, with him as head tracker. Joseph was interested. "As soon as I have another way to make a living," he said, "I will forget about bushmeat and hunting. I have no future now."

After mulling over the plan, however, Joseph turned cynical. His worry was for eating today, not conserving wildlife for tomorrow. "People tell me, 'Don't hunt gorilla, chimpanzee, pangolin,'" he said. "Why should I not shoot these animals? They're meat. They're plentiful. In Cameroon, there are a million gorillas. Three weeks ago, I saw sixty in one day. I shot three and then stopped. When I wound a gorilla and he runs away, I feel very sad—sad for me. Why should I feel bad for a gorilla? He is just a stupid animal."

We phoned from our hotel in Bertoua to try to arrange Boumba's transfer to the Limbe Zoo. The telephone lines to Limbe and Yokadouma were down. Ammann left messages for the zoo director, but he could not reach Pierre, who was to have met us at the conference. By the final day, Pierre still had not arrived.

As we were checking out of our hotel, Ammann's call to Yokadouma went through. Remarkably, Pierre was at home. He had skipped work to care for Boumba, who had stopped eating, developed severe diarrhea, and grown listless. Pierre had summoned his personal physician, but it was too late. Boumba had died that morning, an hour before our call.

Managing the Environment

This section takes a closer look at the social institutions involved in public and private ecological initiatives. Following Escobar's recommendation (Section 4), this section considers the growing controversies surrounding the rights and competencies of particular groups to manage environmental resources. These groups include government agencies, local and international nongovernmental groups, local and multinational businesses, environmental activists, and the scientific community. This section, thus, considers the intersection of global and local from an institutional perspective.

What is globalization? Does it affect everyone equally? What is globalization's relationship to notions of governance? This section begins to answer these questions, first, with Luke's application of Michel Foucault's writing on the links among power and knowledge and language. Luke applies Foucault's ideas to the work of a global environmental watchdog organization, the Worldwatch Institute. The selections that follow look at environmental management from different levels and logics of governance. Environmental historian Libby Robin, in an Australian example, describes the history of tensions between professional ecologists and activist greens. These conflicts center on who will influence Australian environmental policies and reveal different interpretations of environmental problems. Then, Susan Stonich and Billie Dewalt use a "political ecology" approach to consider how the hierarchy of institutions surrounding Honduran natural resources affects environmental degradation. In Stonich and DeWalt's writing, political ecology examines how the actions of people in powerful institutions, such as government agencies, affect local environments.

Anthropologists increasingly investigate local organizations, contrasting their work with that of global institutions like the World Bank, the International Monetary Fund, and the World Trade Organization. In his contribution, Akhil Gupta describes how Indian farmers respond to global hierarchies that place local groups at a disadvantage. Gupta frames global organizations by emphasizing the divide between wealthy countries located in the northern hemisphere (the North) and developing countries in the southern hemisphere (the South).

Discussions about environmental management are overtly based in politics and the economy, so in this section's polemical pieces, advisors to Al Gore's presidential campaign argue for continued U.S. involvement in global institutions, partly because they believe global environmental degradation now poses a security threat to the United States. The authors offer specific policy prescriptions for how that involvement might

take place. Finally, environmental philosopher Kristin Shrader-Frechette argues against both the individualism of capitalist economics and the ecological holism proffered by sustainable development theorists. Shrader-Frechette promotes a third path she believes is both feasible and ethically defensible.

On Environmentality

*Geo-Power and Eco-Knowledge in the Discourses of
Contemporary Environmentalism*

Timothy W. Luke

This study examines how discourses of nature, ecology, or the environment, as disciplinary articulations of "eco-knowledge," might be reinterpreted as efforts to generate systems of "geo-power" over, but also within and through, Nature for the governance of modern economies and societies. The thinking of Michel Foucault, particularly his notions of sexuality and bio-power as mediations for discursively formed discipline, provides a basis for this reinterpretation, because many of the terms associated with "the environment" are perplexing until one puts them under a genealogical lens. These dynamics have been at play for nearly a hundred and thirty years—or at least since self-consciously ecological discourses were formulated by George Marsh (1885) or Ernst Haeckel (1866) in the nineteenth century—but their operations are particularly apparent today.

While many examples of such tendencies might be mobilized here, this examination of geo-power systems as a mediation of environmentality will center upon only one—the work of the Worldwatch Institute. The continuous attempt to reinvent the forces of Nature in the economic exploitation of advanced technologies, linking structures in Nature to the rational management of its energies as geo-power, is an ongoing supplement to the disciplinary construction of various modes of bio-power in promoting the growth of human populations (Foucault, *History of Sexuality* I 140–41). Directed at generating geo-power from the more rational insertion of natural and artificial bodies into the machinery of production, discourses of environmentality can be seen fabricating disciplinary environments where power/knowledge operate as ensembles of geo-power and eco-knowledge.

In and of itself, Nature arguably is meaningless until humans assign meanings to it by interpreting some of its many signs as meaningful (Bramwell, Eckersley). The outcomes of this activity, however, are inescapably indeterminate. Because different human beings will observe its patterns, choosing to accentuate some while deciding at the same time to ignore others, Nature's meanings always will be multiple and unfixed. Only these interpretive acts can construct contestable textual fields, which

can then be read on various levels of expression for their many manifest or latent meanings. Before technologies turn its matter and energy into products, Nature already is transformed discursively into "natural resources." And, once it is rendered intelligible through these discursive processes, it can be used to legitimize almost anything. Therefore, this analysis will look into the discursive uses and conceptual definitions of some common theoretical notions, like "the environment," "environmentalism," and "environmentalist," to reconsider how many contemporary environmentalists are giving a new look to "the environment," as a concept, by transforming its identity in the practices of "environmentality." Finally, as these preliminary navigational bearings indicate, doubts are raised here about the apparently benign intentions of environmental actions, given the disciplinary propensities of the practices embedded in this new regime of environmentality.

For more concrete evidence to justify such caution, this study of geo-power and eco-knowledge will look at the work of the Worldwatch Institute. Established in 1974 amidst the economic and political panic sparked by the OPEC oil crisis of 1973, the Worldwatch Institute might be dismissed as just another nest of D.C. policy wonks, turning out position papers on water scarcity, reforestation, windmill economics, and overpopulation. This image of the Worldwatchers is accurate, but incomplete. And, given this incompleteness, worldwatching ought not to be quickly ignored or easily dismissed. Such activities can be the essence of power/knowledge formation, because much of what policy wonks do basically boils down to defining, creating, and enforcing discursive regimes of disciplinary truth. Consequently, this analysis carefully re-reads one recent Worldwatch Institute publication, *Saving the Planet: How to Shape an Environmentally Sustainable Global Economy* (1991) by Lester Brown, Christopher Flavin, and Sandra Postel, to illustrate how the eco-knowledge generated by the Worldwatch Institute might be seen as a mediation of environmentality in a new regime of geo-power.

Eco-Diction: Making Nature Speak as "Environment"

Many individuals who are intent upon turning the world into "a better place to live" often turn today to "the environment" in order to make their improvements. Believing that they must do anything and everything to protect "the environment," they transform this undertaking into a moral crusade. Their struggles, however, are often hobbled by a fundamental lack of clarity about what "the environment" actually *is*. This lack of certainty or centeredness in the meaning of environments is intriguing, because so many contemporary ecological discourses articulate their visions of moral value, political organization, and social control by stressing the salience of solving "environmental problems" for contemporary society.

"Environment," "environmentalism," and "environmentalist" are words used and accepted so broadly now that it is difficult to remember how recently they came into such wide currency. Before 1965, their use in ordinary discussions actually was quite rare in most policy discourses. More suggestive terms, like "Nature," "conservation," or "ecology," typically were deployed in making references about the characteristics of

the environmental. Now, a generation later, in the 1990s, Nature in these discourses occasionally will speak as "Nature," but increasingly its presence is marked as "the environment." This twist is interesting inasmuch as the various meanings of Nature, while remaining fully contestable, are somewhat clearer than a generation ago. At the same time, the meanings of the "environment," which are essentially uncontested, remain very unclear. Documenting this shift in usage is not an exact practice, but to start, one might look briefly through newspaper indices or expert discourses to develop a sense of the shift.

In 1960, or the year Rachel Carson's *New Yorker* essays on how pesticides were despoiling wildlife first drew broad public attention, there is only one story in *The New York Index* about environmental science, and it ties the topic to "astronautics." Five years earlier, in 1955, the word is not even registered in the index, but by 1965 there are four entries about "the environment," one of them about a speech by President Johnson on the need for greater efforts at conservation and beautification in preserving the environment. By 1970, there are almost two and a half entire pages of citations. And, more importantly, the concept remains a significant feature in the index during every year after 1970: one and two-thirds pages in 1975, one and a third in 1980, two pages in 1985, and three and a third in 1990. Even though increasing attention is being allotted in *The New York Times* to concerns that are broadly labeled as "environmental" or "environmentalistic," what "the environment" means to the press is much less clear. It encompasses Nature, conservation, and ecology as well as pollution, deforestation, and contamination.

Despite all of the talk about its central importance, "the environment" constantly escapes exacting definition, even in expert "environmentalist" discourses. For almost any given ecological writer, the significance of the environment and environmentalism is now apparently assumed to be so obvious that precise definitions are superfluous. ReVelle and ReVelle in their text *The Environment: Issues and Choices for Society* (1988), for example, name their book after the environment, but they fail to include any definition of what it means in their book's glossary or analysis. Buchholz in *Principles of Environmental Management: The Greening of Business* (1993) does not define the environment as a vital concept in ecology, even though he recounts standard dictionary definitions, presenting it as the surroundings that are natural organisms' ecological settings (29–30). When the environment is defined by experts, it basically encompasses everything.

Interestingly, this tendency also marks the work of explicitly political analyses of the environment (Paehlke). Even Barry Commoner, whose political thinking on environmental problems from the 1960s through the 1990s has won wide respect, takes this analytical path. Commoner does not directly confront the concept of the environment; instead, he divides Nature into "two worlds: the natural ecosphere, the thin skin of air, water, and soil and the plants and animals that live in it, and the man-made technosphere," which now has become

> sufficiently large and intense to alter the natural processes that govern the ecosphere. And in turn, the altered ecosphere threatens to flood our great cities, dry up our bountiful farms, contaminate our food and water, and poison our bodies—catastrophically diminishing our ability to provide for basic human needs. (*Commoner* 7)

Ultimately, Commoner depicts these two worlds as being "at war." As humans in the technosphere disrupt the ecosphere, the ecosphere responds with equally or more disruptive secondary effects in the technosphere. In some sense, the environment is "Nature" for Commoner, but it is also "Society," or, more accurately, Nature-as-transformed-by-Society. The prospect of something like "geo-power," in turn, is foreshadowed by expert intellectual interventions typified by his critiques. In fact, geo-power might be seen as the means of productively fusing the technosphere with the biosphere through the right codes of eco-knowledge.

This curious absence of clear definition can be tracked back beyond Commoner to Carson's original call for greater environmental awareness. *Silent Spring*, as it appeared in *The New Yorker* in 1960, and as a book in 1962, largely directed its analysis at "the web of life" rather than "the environment." Still, in reexamining how unregulated application of chemical pesticides adversely affected biotic communities in the world's overlapping and interconnecting food chains, Carson constructed a provisional reading of "the environment." That is, some substances from the technosphere (chemical pesticides) were invented to kill something in the biosphere (animal pests). While their application was intended to control only those animals that ate crops, carried disease, and infested dwellings, their impact was much broader. Pesticides soon spread through everything in the ecosphere—both human technosphere and nonhuman biosphere—returning from the "out there" of natural environments back into plant, animal, and human bodies situated at the "in here" of artificial environments with unintended, unanticipated, and unwanted effects. By using zoological, toxicological, epidemiological, and ecological insights, Carson generated a new sense of how "the environment" might be seen. However, she never based her analysis directly upon a formalized notion of "the environment" or "environmental damage."

Of course, any concept, like "the environment," "environmentalism," or "environmentalist," can be deployed as indistinctly as all of these patterns of use indicate. In noting how the words are used, one sees what we might ordinarily expect: namely, that they tend to mean various things to many people in several different contexts. Another approach to the problem would be to develop a provisional genealogy of the term's early origins to reveal other more embedded understandings of "the environment" that could be more suggestive than the sense of "environment" which encompasses *all* surroundings, *every* factor that affects organisms, the *totality* of circumstances, or the *sum* complex of conditions. A return to the semantic origins of environment, then, might illuminate some of these ambiguities and clarify how environmentalistic concepts actually work in the present.

On Environing

Perhaps the early origins of "the environment" as a concept—its historical emergence and original applications—might prove more helpful. In its original sense, which is borrowed by English from Old French, an environment is an action resulting from, or the state of being produced by a verb: "to environ." And environing as a verb is, in fact, a type of strategic action. To environ is to encircle, encompass, envelop, or enclose. It

is the physical activity of surrounding, circumscribing, or ringing around something. Its uses even suggest stationing guards around, thronging with hostile intent, or standing watch over some person or place. To environ a site or a subject is to beset, beleaguer, or besiege that place or person.

An environment, as either the means of such activity or the product of these actions, now might be read in a more suggestive manner. It is the encirclement, circumscription, or beleaguerment of places and persons in a strategic disciplinary policing of space. An environmental act, in turn, is already a disciplining move, aimed at constructing some expanse of space—a locale, a biome, a planet as biospherical space, or, on the other hand, some city, any region, the global economy in technospherical territory—in a discursive envelope. Within these enclosures, environmental expertise can arm environmentalists who stand watch over these surroundings, guarding the rings that include or exclude forces, agents, and ideas.

If one thinks about it, this original use of "the environment" is an accurate account of what is, in fact, happening in many environmental practices today. Environmentalized places become sites of supervision, where environmentalists see from above and from without through the enveloping designs of administratively delimited systems. Encircled by enclosures of alarm, environments can be disassembled, recombined, and subjected to the disciplinary designs of expert management. Enveloped in these interpretive frames, environments can be redirected to fulfill the ends of other economic scripts, managerial directives, and administrative writs. Environing, then, engenders "environmentality," which embeds instrumental rationalities in the policing of ecological spaces.

Environmentality and Governmentality

These reflections on "the environment" reframe its meanings in terms of the practices of power, allowing us to turn to Michel Foucault for additional insight. The bio-power formation described by Foucault was not historically closely focused upon the role of Nature in the equations of biopolitics (Foucault, *History of Sexuality* I 138–42). For Foucault, the whole point of the controlled tactics of inserting human bodies into the machineries of industrial and agricultural production as part and parcel of strategically adjusting the growth of human populations to the development of industrial capitalism was to bring "life and its mechanisms into the realm of explicit calculations," making the disciplines of knowledge and discourses of power into many agencies as part of the "transformation of human life" (143). Once this threshold of bio-power was crossed, human economics, politics, and technologies continually placed all human beings' existence into question.

Foucault notes that these industrial transformations implicitly raised ecological issues as they disrupted and redistributed the understandings provided by the classical episteme of defining human interactions with Nature. Living became "environmentalized," as humans related to their history and biological life in new ways from within growing artificial cities and mechanical modes of production, which positioned this new form of human being "at the same time outside history, in its biological

environment, and inside human historicity, penetrated by the latter's techniques of knowledge and power" (143). Here we can begin to locate the emergence of "the environment" as a nexus for knowledge formation and as a cluster of power tactics. As human beings began to consciously wager their life as a species on the outcomes of these biopolitical strategies and technological systems, it became clear that they also were wagering the lives of other (or all) species as well. While Foucault regards this shift as one of many lacunae in his analysis, it is clear there is much more going on here than he realizes. Once human power/knowledge formations become the foundation of industrial society's economic development, they also become the basis for the physical survival of all terrestrial life forms. Here, ecological analysis emerges as a productive power formation that reinvests human bodies—their means of health, modes of subsistence, and styles of habitation integrating the whole space of existence—with bio-historical significance by framing them within their various bio-physical environments filled with various animal and plant bodies.

Foucault can be read as dividing the environment into two separate, but interpenetrating spheres of action: the biological and the historical. For most of human history, the biological dimension, or forces of Nature working in the forms of disease and famine, dominated human existence with the ever-present menace of death. Developments in agricultural technologies as well as in hygiene and health techniques, however, gradually provided some relief from starvation and plague by the end of the eighteenth century. As a result, the historical dimension began to grow in importance as "the development of the different fields of knowledge concerned with life in general, the improvement of agricultural techniques, and the observations and measures relative to man's life and survival" averted some of the imminent risks of death (142). In other words, "the historical" starts to envelop, circumscribe, and surround "the biological." Hence, environmentalized settings emerged "in the space of movement thus conquered, and broadening and organizing that space, methods of power and knowledge assumed responsibility for the life processes and undertook to control and modify them" (142). While he does not explicitly define these spaces, methods, and knowledges as such as being "environmental," it appears that such maneuvers were crucial to the emergence of environmentalization. As biological existence was refracted through economic, political, and technological existence, "the facts of life" passed into fields of control for eco-knowledge and spheres of intervention for geo-power.

Environments then emerged with bio-power as part and parcel of the regulation of life via biopolitics, and, for nearly a century, ecology apparently remained another ancillary correlate of bio-power, inhabiting discourses about species extinction, resource conservation, and overpopulation. Until the productive regime of biopolitics became fully globalized (because Nature itself is not entirely encircled), ecology was a fairly minor voice in the disciplinary chorus organizing development and growth. Things changed, however, once the extensive expansionist strategies of development and growth employed in the eighteenth and nineteenth centuries collapsed around 1914, promoting conservationist ethics in Europe and North America that fretted over conserving resources for resource-driven intensive modes of production. And, as new mediations of development and growth were constructed after 1945, the geo-power/

eco-knowledge nexus of environmentalization came to comfortably supplement the high technology, capital intensive development strategies that have since been implemented.

Thus, the environment, if one follows Foucault's line of reasoning (105–06), must not be understood as the naturally given sphere of ecological processes which human powers try to keep under control, nor should it be viewed as a mysterious domain of obscure terrestrial events which human knowledge works to explain. Instead, it emerges as a historical artifact that is openly constructed, not an occluded reality that is difficult to comprehend. In this great network, the simulation of spaces, the intensification of resources, the incitement of discoveries, the formation of special knowledges, the strengthening of controls, and the provocation of resistances can all be linked to one another.

The immanent designs of Nature, when and where they are "discovered" in environments, closely parallel the arts of government. One might ask if the two are not inseparable in geo-power/eco-knowledge systems. As Foucault sees the arts of government, they essentially are concerned with how to introduce economy into the political practices of the state. Government becomes in the eighteenth century the designation of a "level of reality, a field of intervention, through a series of complex processes" in which "government is the right disposition of things" ("Governmentality" 93). Governmentality applies techniques of instrumental rationality to the arts of everyday management. It evolves as an elaborate social formation, or "a triangle, sovereignty-discipline-government, which has as its primary target the population and as its essential mechanism the apparatuses of security" (102).

Most significantly, Foucault sees rulers and authorities mobilizing governmentality to bring about "the emergence of population as a datum, as a field of intervention and as an objective of governmental techniques" (102) so that now "the population is the object that government must take into account in all its observations and *savoir*, in order to be able to govern effectively in a rational and conscious manner" (100). The networks of continuous, multiple, and complex interaction between populations (their increase, longevity, health), territory (its expanse, resources, control), and wealth (its creation, productivity, distribution) are sites of governmentalizing rationality to manage the productive interaction of these forces.

Foucault invites social theorists not to reduce all ensembles of modernizing development to the "statalization" of society wherein "the state" becomes an expansive set of managerial functions, discharging its effects in the development of productive forces, the reproduction of relations of production, or the organization of ideological superstructures. Instead he argues in favor of investigating the "governmentalization" of the economy and society whereby individuals and groups are enmeshed within the tactics and strategies of a complex form of power whose institutions, procedures, analyses, and techniques loosely manage mass populations and their surroundings in a highly politicized symbolic and material economy (103). Because governmental techniques are the central focus of political struggle and contestation, the interactions of populations with their natural surroundings in highly politicized economies compel states constantly to redefine what is within their competence throughout the modernizing process. To survive after the 1960s in a world marked by decolonization,

global industrialization, and nuclear military confrontation, it is not enough for states merely to maintain legal jurisdiction over their allegedly sovereign territories. As ecological limits to growth are either discovered or defined, states are forced to guarantee their populations' fecundity and productivity in the total setting of the global political economy by becoming "environmental protection agencies."

Governmental discourses methodically mobilize particular assumptions, codes, and procedures in enforcing specific understandings about the economy and society. As a result, they generate "truths" or "knowledges" that also constitute forms of power with significant reserves of legitimacy and effectiveness. Inasmuch as they classify, organize, and vet larger understandings of reality, such discourses can authorize or invalidate the possibilities for constructing particular institutions, practices, or concepts in society at large. They simultaneously frame the emergence of collective subjectivities (nations as dynamic populations) and collections of subjects (individuals) as units in such nations. Individual subjects as well as collective subjects can be reevaluated as "the element in which are articulated the effects of a certain type of power and the reference of a certain type of knowledge, the machinery by which the power relations give rise to a possible corpus of knowledge, and knowledge extends and reinforces the effects of this power" (Foucault, *Discipline and Punish* 29). Therefore, an environmentalizing regime must advance eco-knowledges to activate its command over geo-power as well as to re-operationalize many of its notions of governmentality as environmentality. Like governmentality, the disciplinary articulations of environmentality must center upon establishing and enforcing "the right disposition of things."

New Power/Knowledge

The Worldwatch Institute provides a curious instantiation of how regimes of environmentality might be seen at work in the processes of developing a geo-power/eco-knowledge formation. Taking the world as one ecological site, the Worldwatch Institute aptly typifies a green power/knowledge center in the play of current-day environmental politics. Seeing the path of untrammeled industrial development as the cause of environmental crises, a recent Worldwatch Institute book by Brown, Flavin, and Postel attributes the prevailing popular faith in material growth to "a narrow economic view of the world" (21). Any sense of constraint on further growth is cast by economics "in terms of inadequate demand growth rather than limits imposed by the earth's resources" (22). Ecologists, however, study the allegedly complex changing relationships of organisms with their environments, and, for them, "growth is confined by the parameters of the biosphere" (22). For Brown, Flavin, and Postel, economists ironically regard ecologists' concerns as "a minor subdiscipline of economics—to be 'internalized' in economic models and dealt with at the margins of economic planning," while "to an ecologist, the economy is a narrow subset of the global ecosystem" (23). To end this schism, the Worldwatch Institute pushes for melding ecology with economics to infuse environmental studies with economic instrumental rationality and defuse economics with ecological systems reasoning. Once this is done, the roots of economic growth no longer can be divorced from "the natural systems and resources

from which they ultimately derive," and any economic process that "undermines the global ecosystem cannot continue indefinitely" (23).

With this rhetorical maneuver, the Worldwatch Institute articulates its vision of geo-power/eco-knowledge as the instrumental rationality of resource managerialism working on a global scale. Nature, now reinterpreted as a cybernetic system of bio-physical systems, reappears among nation-states in those "four biological systems—forests, grasslands, fisheries, and croplands—which supply all of our food and much of the raw materials for industry, with the notable exceptions of fossil fuels and minerals" (Brown, Flavin, and Postel 73). As a result, the performance of these systems might be monitored in analytical spreadsheets written in bioeconomic terms, and then judged in equations balancing increased human population and highly constrained base ecosystem outputs. When looking at these four systems, one must recognize that Nature is merely a system of energy-conversion systems:

> Each of these systems is fueled by photosynthesis, the process by which plants use solar energy to combine water and carbon dioxide to form carbohydrates. Indeed, this process for converting solar energy into biochemical energy supports all life on earth, including the 5.4 billion members of our species. Unless we manage these basic biological systems more intelligently than we now are, the earth will never meet the basic needs of 8 billion people.
>
> Photosynthesis is the common currency of biological systems, the yardstick by which their output can be aggregated and changes in their productivity measured. Although the estimated 41 percent of photosynthetic activity that takes place in the oceans supplies us with seafood, it is the 59 percent occurring on land that supports the world economy. And it is the loss of terrestrial photosynthesis as a result of environmental degradation that is undermining many national economies. (73–74)

Photosynthetic energy generation and accumulation, then, is to become the accounting standard for submitting such geo-power to environmentalizing discipline. It imposes upper limits on economic expansion; the earth is only so large. The 41 percent that is aquatic and marine as well as the 59 percent that is terrestrial are actually decreasing in magnitude and efficiency due to "environmental degradation." Partly localized within many national territories and partly globalized as transboundary pollution, the system of systems needs global management—a powerful, all-knowing world watch—to mind its environmental resources.

Such requirements arise from the convergence of dangerous trends identified by such bioeconomic accounting:

> 40 percent of the earth's annual net primary production on land now goes directly to meet human needs or is indirectly used or destroyed by human activity—leaving 60 percent for the millions of other land-based species with which humans share the planet. While it took all of human history to reach this point, the share could double to 80 percent by 2030 if current rates of population growth continue; rising per capita consumption could shorten the doubling time considerably. Along the way, with people usurping an ever larger share of the earth's life-sustaining energy, natural systems will unravel faster. (74)

To avoid this collapse, human beings must stop increasing their numbers so rapidly, halt increasingly resource-intensive modes of production, and limit increasing levels of material consumption. All of these ends require a measure of surveillance and degree of steering beyond the modern nation-state, but perhaps *not* beyond some postmodern worldwatch engaged in the disciplinary tasks of equilibrating the "net primary production" of solar energy fixed by photosynthesis in the four systems. Natural resources in the total solar economy of food stocks, fisheries, forest preserves, and grass lands are rhetorically ripped from Nature only to be returned as environmental resources, enveloped in accounting procedures and encircled by managerial programs.

The Worldwatch Institute writers here are engaged in a struggle "for truth" in economic and environmental discourse. By simultaneously framing economics with the bad rap of growth fetishism and twinning ecology with the high purpose of documenting environmental interconnectedness, the Worldwatchers are striving to transform fields of knowledge as bands of power. Inasmuch as today's decentered networks of power operate through relations of truth "linked in a circular relation with systems of power which produce and sustain it, and to effects of power it induces and which extend it" (Foucault, *History of Sexuality* I 144), these discursive alterations are the requisite moves for prevailing in a disciplinary struggle for discursive authority. By shifting the authorizing legitimacy of truth claims used in policy analysis away from *economic* terms to *ecological* terms (as they are cast in these thermodynamic allusions), the Worldwatch Institute's experts are working to reframe the power/knowledge systems of advanced capitalist societies.

The Environment as Disciplinary Space

Environmentality, then, would govern by restructuring today's ecologically unsound society through elaborate managerial designs to realize tomorrow's environmentally sustainable economy. The shape of an environmental economy would emerge from a reengineered economy of environmentalizing shapes vetted by worldwatching codes. The individual human subject of today, and all of his or her unsustainable practices, would be reshaped through this environmentality, redirected by practices, discourses, and ensembles of administration that more efficiently synchronize the bio-powers of populations with the geo-powers of environments. Traditional codes defining human identity and difference would be reframed by systems of environmentality in new equations for making comprehensive global sustainability calculations as the bio-power of populations merges with the ecopower of environments. To police global carrying capacity, in turn, this environmentalizing logic bids each human subject to assume the much less capacious carriage of disciplinary frugality instead of affluent suburban consumerism. All of the world will come under watch, and the global watch will police its human charges to dispose of their things and arrange their ends—in reengineered spaces using new energies at new jobs and leisures—around these environing agendas.

Sustainability, however, cuts both ways. On the one hand, it can articulate a rationale for preserving Nature's biotic diversity in order to maintain the sustainability of the

biosphere. But, on the other hand, it also can represent an effort to reinforce the prevailing order of capitalistic development by transforming sustainability into an economic project. To the degree that modern subjectivity is a two-sided power/knowledge relation, scientific-professional declarations about sustainability essentially describe a new mode of environmentalized subjectivity. In becoming enmeshed in a worldwatched environ, the individual subject of a sustainable society could become simultaneously "subject to someone else by control and dependence," where environmentalizing global and local state agencies enforce their codes of sustainability, and police a self-directed ecological subject "tied to his own identity by a conscience or self-knowledge" (Foucault, "Afterword" 212). In both manifestations, the truth regime of ecological sustainability draws up criteria for what sort of "selfness" will be privileged with political identity and social self-knowledge.

Sustainability, like sexuality, becomes a discourse about exerting power over life. How power might "invest life through and through" (Foucault, *History of Sexuality* I 139) becomes a new challenge, once biopolitical relations are established as environmentalized systems. Moreover, sustainability more or less presumes that some level of material and cultural existence has been attained that is indeed worth sustaining. This formation, then, constitutes "a new distribution of pleasures, discourses, truths, and powers; it has to be seen as the self-affirmation of one class rather than the enslavement of another: a defense, a protection, a strengthening, and an exaltation … as a means of social control and political subjugation" (123).

The global bio-accounting systems of the Worldwatch Institute conceptually and practically exemplify the project of environmentality with their rhetorics of scientific surveillance. How Nature should be governed is not a purely administrative question turning upon the technicalities of scientific "know-how." Rather, it is essentially and inescapably political. The discourses of Worldwatching that rhetorically construct Nature also assign powers to new global governors and governments, who are granted writs of authority and made centers of organization in the Worldwatchers' environmentalized specifications of managerial "who-can" and political "how-to."

Instituting a Worldwatch: The Eco-Panopticon

Not surprisingly, then, the various power/knowledge systems of instituting a Worldwatch environmentality appear to be a practical materialization of panoptic power. The Worldwatch Institute continually couches its narratives in visual terms, alluding to its mission as outlining "an ecologically defined vision" of "how an environmentally sustainable society would look" in a new "vision of a global economy." As Foucault claims, "whenever one is dealing with a multiplicity of individuals on whom a particular form of behavior must be imposed, the panoptic schema may be used" (*Discipline and Punish* 205) because it enables a knowing center to reorganize the disposition of things and redirect the convenient ends of individuals in environmentalized spaces. As organisms operating in the energy exchanges of photosynthesis, human beings can become environed on all sides by the cybernetic system of biophysical systems composing Nature.

Worldwatching, in turn, refixes the moral specification of human roles and responsibilities in the enclosed spaces and segmented places of ecosystemic niches. And, in generating this knowledge of environmental impact by applying such powers of ecological observation, the institutions of Worldwatch operate as a green panopticon, enclosing Nature in rings of centered normalizing super-vision where an eco-knowledge system identifies Nature as "the environment." The notational calculus of bioeconomic accounting not only can, but in fact must reequilibrate individuals and species, energy and matter, inefficiencies and inequities in an integrated panel of globalized observation. The supervisory gaze of normalizing control, embedded in the Worldwatch Institute's panoptic practices, adduces "the environmental," or enclosed, segmented spaces, "observed at every point, in which the individuals are inserted in a fixed place, in which the slightest movements are supervised, in which all events are recorded, in which an uninterrupted work of writing links the centre and periphery, in which power is exercised without division, according to a continuous hierarchical figure, in which each individual is constantly located, examined, and distributed among the living beings, the sick and the dead" (Foucault, *Discipline and Punish* 197). To save the planet, it becomes necessary to environmentalize it, enveloping its system of systems in new disciplinary discourses to regulate population growth, economic development, and resource exploitation on a global scale with continual managerial intervention.

Many contemporary environmental movements, particularly those inspired by the Worldwatch Institute's analyses, push governmentality to a global rather than a national level of control. The biosphere, atmosphere, and ecosphere are all reintegrated into the truth regime of political economy to serve more ecological ends, but they are also made to run along new economic tracks above and beyond the territorial spaces created by nation-states. By touting the necessity of recalibrating society's logics of governmentality in new spatial registers at the local and global level, the geo-power politics of environmentality aim to rewrite the geographies of national stratified space with new mappings of bioregional economies knitted into global ecologies—complete with environmentalized zones of "dying forests," "regional desertification," "endangered bays," or "depleted farmland."

If Foucault's representation of governmentality accounts for the practices of power mobilized by centered national sovereigns in the era of capitalist modernization and national state-building after 1648, the Worldwatch Institute's approach to environmentality perhaps foreshadows the practices of power being adduced by multicentric alliances of transnational capital or loose coalitions of highly fragmented local sovereignties, following the collapse of the old Cold War competitions in the early 1990s. New spatial domains are being created in the world today, on the one hand, by pollution, nuclear contamination, and widespread rapid deforestation, and, on the other, by telecommunications, jet transportation, and cheap accessible computerization. Nation-states are not answering effectively the challenges posed within their borders by these new spaces. But a variety of new organizations in the contemporary environmental movement, like the Worldwatch Institute, Earth First!, The World Wildlife Federation, or Greenpeace, at least are addressing, if not answering, how these spaces are developing, what impact they have in today's political economy, and who should act to respond to the challenge. In the bargain, they also are interposing their own

environmentalizing conceptual maps, technical disciplines, and organizational orders on these spaces as they urge local citizen's groups or global supranational agencies to move beyond the constraints imposed by national sovereignty to construct new sustainable spaces for human habitation.

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Radical Ecology and Conservation Science
An Australian Perspective

Libby Robin

The political difficulty of undertaking conservation is always greatest when the imperative for economic development is at its most jingoistic. In 1950s Australia, the post-war development boom was in full swing. The population was growing rapidly, both through post-war births and through immigration. Between 1945 and 1960 the population rose from 7.3 million to 10.4 million, and it was a young population, a population 'with a future'.[1] The demand for housing materials, for example, seriously exceeded supply. Governments were actively encouraging people to build their own homes because of the shortages of skilled builders to meet the demand, and were requiring that such houses be limited in size to reduce demand on such basics as nails and timber.[2] The rhetoric encouraged individuals to make personal sacrifices in the interests of 'nation building'.

At the centre of 'national reconstruction' was a project to build a massive hydro-electricity scheme in Australia's highest mountains. The Snowy Mountains are in the south-eastern corner of the continent, strategically located between Australia's largest cities, Sydney and Melbourne, and rather closer to Canberra, the seat of national government. The hydro-electricity scheme was devised and managed by the Snowy Mountains Authority, a massive government agency with a brief to build a system of hydro-electricity stations (through both private and public funding). The complexities of the scheme were considerable as it straddled two states (New South Wales and Victoria) and the Australian Capital Territory, and had implications for a third state. South Australia, down-stream of the works. The states' co-operation was at least partly gained through the offer of 'free irrigation to farmers downstream' as a by-product.[3] The hydro-electricity scheme was rhetorically linked to national pride. It was associated with building secondary industry, something very important to a nation with a predominantly agricultural economy at the time. The 'Snowy Scheme' was the subject of jingoistic films, was promoted as a tourist attraction, and was an important 'topic' in the curriculum of school children in the eastern states. Newly arrived immigrants from war-torn Europe provided the work force for the scheme and were told by William (later Sir William) Hudson, the scheme's first commissioner: 'You won't be

Balts or Slavs … you will be men of the Snowy'.[4] Hudson's nationalistic rhetoric was typical of the time. The scheme was so 'Australian', its imprimatur was capable of giving new immigrants quick status as 'real Australians'. The scheme's overwhelming contemporary popularity and the subsequent perception of its 'success' is attributable, at least in part, to the capacity of the Authority to take advice at critical times. The young science of soil conservation, which offered significant (but not always popular) advice to the Authority, was important to the perceived success of the scheme in both engineering and in politics.

Australia, like the United States of America, had suffered massive soil erosion in the 1930s resulting in enormous ecological damage and personal suffering. Country people, like the 'Okies' in John Steinbeck's *Grapes of Wrath*, left the land for the cities. There was often deep shame felt by these people, especially those farming the small allotments issued to soldiers returned from the first world war, who felt they had failed personally. Some left their properties in the middle of the night without farewelling neighbours.[5] Government agencies for soil conservation were established in New South Wales in 1938 and Victoria in 1940, and while they were never big, in the 1950s they were taken seriously, as the nation's response to the massive agricultural disaster which had touched so many people.

The central story in this paper is about the role of science in mediating the nationalism inherent in both the grand engineering scheme and in the management of soil conservation. The science in the cross-fire was ecology.

'Ecology' first came to popular notice in Australia through nature study in the 1940s, and was often associated with romantic views on the 'web of life'.[6] Most practising ecologists of the time were quite comfortable with this type of popularisation. In the 1950s, ecological scientists were glad of a public profile. But by the 1970s, when the word 'ecology' came increasingly to mean politics rather than science, many scientific ecologists became disconcerted. They sought to distance themselves from the popular images of the subject, in particular the anti-science and anti-technology rhetoric of parts of the environment movement, and to reassert the scientific status of the discipline.[7]

This paper explores the role of science in the management of the environment through conservation and ecology. It focuses on the 1950s, what (in an American context) Gregg Mitman has described as a 'lost decade in environmental history'.[8] It is a decade which has been lost perhaps because of a perception that it was a time of 'political contentment and acquiescence in the system'.[9] But while the 1950s were a time when scientific understandings themselves were less closely scrutinised, there is no doubt that scientists were far from acquiescent in the 'system'. It was a formative period for many senior ecologists, and may, in subtle ways, still be shaping Australia's environmental debates.

The Institutional Structure of Scientific Ecology in Australia

Ecologists in Australia are generally sponsored by universities or government agencies, but not by the corporate or private sectors. Australia's scientists traditionally have

been forced by isolation to work as all-rounders rather than narrow specialists, and even academic scientists have rarely had the privilege of being funded for 'pure research'.[10] This pattern is particularly apparent in a discipline as small as ecology. Ecology is not prestigious in Australian universities. Ecology is generally regarded as a subset of Botany, Zoology, Biology, Environmental Science or even Forestry. It seldom stands alone as a teaching or research discipline. Ecological scientists who work in universities therefore have to be actively concerned about their image within their wider scientific departments.[11] There are a number of chairs in environmental science and biological sciences that have been held by practising ecologists, but the lack of named ecological chairs is a reflection of the fact that ecology is low in the hierarchical stakes in Australian universities.

Raymond L. Specht, himself a distinguished ecologist and former Professor of Botany at the University of Queensland, surveyed forty of his contemporaries who undertook postgraduate ecological studies in the period from 1930 to 1955.[12] He described a drift of ecologists away from ecology towards other fields as they get older. He noted that half of these opted out of field work, seventeen moving to taxonomy and three to plant physiology. Only seven of the early plant ecologists were still active in plant ecology in 1981. Four died relatively young, and the remaining nine took early retirement from university employment to pursue careers as environmental consultants. These figures are reminiscent of the trends in (or rather out of!) ecology in America thirty years earlier noted by the American historian of science, Eugene Cittadino, who described ecology as 'a young man's specialty'.[13] In addition to the hard physical requirements of field work, there is the question of time. Most senior university-based positions carry a heavy administrative and teaching load, making it difficult to undertake field work in distant places at the ecologically appropriate time. Universities in Australia are mostly located in large cities well away from interesting ecosystems, so few field sites can be reached with less than several hours' travelling time. Only a full-time researcher can undertake year-round studies on remote ecosystems. The fact that time and physical fitness are less available to senior academics serves to reduce the prestige of ecology in universities further, and to reinforce its status as a junior sub-discipline of something else.

The pragmatic construction of academic ecology as a sub-set of something else sits uneasily with the popular perception of ecology as an over-arching world view in environmental politics. At the turn of the century, the founders of scientific ecology saw the potential for the subject to have a broad scope. For example, the British physiologist J.S. Burdon-Sanderson in his presidential address to the British Association for the Advancement of Science in 1893 told the audience 'that "oecology" was one of the three great divisions of biology, along with physiology and morphology'.[14] But the way power is organised in universities and research institutions is by discipline, administered through chairs or directors, not by 'great divisions in biology'. At the pragmatic level, ecology is regarded in Australia as either too specialised or too general to be the central organisational focus of a department. University ecologists fight for their space and their research dollar in hostile departments. They have therefore sought and found allies outside university structures.

The most important allies for Australian ecologists historically have been government agencies, especially those charged with responsibility for natural resource management and land use. More ecologists have been employed by government conservation agencies than by universities.[15] The conservation agency sector has contributed significantly to ecological research in many fields. Such agencies have the structural arrangements that make it possible for long, intensive field trips in remote places at the 'right' ecological time (for example, during the relevant flowering or breeding season). The majority of positions for ecologists still come up in the government sector—in land-use management, forestry, national parks and soil conservation agencies. Universities provide a significant number of salaries, but frequently the research funding for these ecologists also comes from the government sector, and work so funded often has an applied or management dimension.

From the 1920s, South Australian university ecologists worked with the Waite Institute for Agricultural Research on the ecology of arid lands.[16] In the early 1940s, Victorian botanists were conscripted into alpine ecology by the Soil Conservation Board.[17] In the 1950s, the Snowy Mountains Authority became interested in alpine ecology through the mediation of the Soil Conservation Service of New South Wales. Ecology and conservation became synonymous and interchangeable terms.

A.B. Costin and Alpine Ecology in the 1950s

Alec Costin is arguably Australia's leading Alpine ecologist, but he is not an 'academic'. Costin's distinction in his field has been recognised by the prestigious Australian Academy of Science, of which he is a Fellow. But his career has been constructed almost entirely outside the university system: he worked for the Soil Conservation Service of New South Wales for eight years, the Soil Conservation Authority of Victoria for three years, and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) for nineteen years.[18] His university affiliations were brief: two years as a scholar affiliated with Sydney University in the early 1950s and a visiting fellow at the Australian National University when in semi-retirement. The support for his fine basic and strategic research came almost exclusively from organisations with utilitarian management obligations. But it was only such organisations that could make ongoing structural allowances for the difficulty of travelling to and from the remote alpine regions where Costin often spent many weeks on field trips.

Costin's eminence in alpine science began with work in the 1940s and 1950s that provided much of the primary descriptions of vegetation communities and soil types of the Australian Alps, especially in the Mt Kosciuszko[19] area. His later analyses built on his descriptive ecology and included catchment hydrology, glaciology and Carbon-14 dating. His most important environmental management papers dealt with the key issue of grazing in the alpine areas. In the mid-1950s Costin was the leader in the move to end 'snow leases', the leases that privilege certain families to graze sheep and cattle in the country above the snow line. Some bushwalking groups had expressed concerns about overgrazing in the fragile alpine country, but the political campaign to remove hard-hooved animals from its delicate soil structures was spearheaded by

ecologists, especially those working for soil conservation agencies in Victoria and New South Wales. In Victoria, the pioneering ecologist Maisie Fawcett also succeeded in drawing political attention to the destruction of alpine ecosystems in the 1940s.[20] Fawcett's collaborator, John Turner, Professor of Botany and Plant Physiology at the University of Melbourne, who co-authored publications associated with the Victorian high-plains research, was also a great supporter of Costin and the environmental campaign for the Kosciuszko 'Tops' in the 1950s.

Costin was able to tackle snow leases more directly in New South Wales than Fawcett was in Victoria because he received strong support from the Snowy Mountains Authority. An enterprising Soil Conservation Service chief convinced the Authority that it had an interest in ensuring that soil drift did not threaten hydro-electric works.[21] Initially, in Costin's words, the Authority 'buggered up the country pretty well everywhere they went'.[22] But once the Snowy Mountains Authority decided that good soil conservation practices were in its interests, it not only softened its own approach to the environment, but it funded the CSIRO to establish an Alpine Ecology Unit at Island Bend, in the middle of its works. Costin was appointed as Senior Research Officer in CSIRO's Alpine Ecology Unit because of his experience in the analysis of alpine ecosystems, including those near the Authority's works, which he had studied for his postgraduate work, sponsored by the New South Wales Department of Agriculture. His credentials as an outspoken opponent of grazing in the high country may well have enhanced his attractiveness to the Authority.[23] The Authority wanted the snow leases ended ostensibly for the sake of water-catchments critical to its hydro-electric works.[24]

It was probably one of the best public relations exercises ever undertaken by such an authority. Not only did it take attention away from its own mistakes, it also served to point the finger at the local farmers as the 'poor land-users' who created environmental havoc by grazing hard-hooved animals on country that could not tolerate such treatment. 'Snow leases' have been central to environmental protests in Australia on and off ever since, especially in Victoria where the mountain cattlemen and cattlewomen (as they call themselves) still have limited use of the high country.[25] Yet, until recently, very few activists or scholars criticised the destruction of alpine environments caused by the Snowy Mountains Authority itself, which is on a much grander scale.[26]

The CSIRO 'Kosciuszko School', as the Alpine Ecology Unit is often called, has earned its right to the title 'School' because alongside its applied research brief, it has also provided leadership and support to many postgraduate students tackling ecological tasks in the high country.[27] Costin's first research focused on the Snowy Mountains Authority's needs, considering vegetation and soil management in relation to water yield in the alpine area.[28] The experimental plots he established in the 1950s are still monitored and are used for considering the effects of the latest problem land-users, the tourists, who now flock to Mt Kosciuszko and surrounding areas in thousands.[29] The soundly analysed plots have also provided longitudinal information which has backgrounded a range of other recent scientific investigations, including the effects of 'greenhouse' and cloud-seeding experiments.[30]

Ecology and Environmental Activism

The Snowy Mountains Authority's 'public relations exercise'—the Alpine Ecology Unit—was not, however, without its problems. A crisis came in the late 1950s when it proposed a dam on Spencers Creek, near the summit of Mt Kosciuszko. This was not an essential dam, but a minor independent project which could bring hydro-electricity into the New South Wales grid relatively quickly, whilst other works were in progress. It was important to the Authority as a way of convincing New South Wales sceptics of the value of the main scheme, but not essential to its success.[31] Spencers Creek did not have sufficient water in its own catchment for hydro-electric purposes, so the Authority proposed the building of aqueducts on both sides of the main range. Costin saw this proposal as a threat to continuing glaciological studies of the Mt Kosciuszko area.[32]

The building of aqueducts was also a violation of National Parks values set out in the *Kosciusko State Park Act* of 1944 and later amendments. This was in the days before a National Parks Authority existed, when each park was managed by a separate small committee. The Kosciusko State Park Trust, which had official control over the area, was simply a small band of nominees and never a strong organisation. Its power had been further eroded by its changing membership during the 1930s and 1940s.[33] Costin and a number of other senior scientists put pressure on the Kosciusko State Park Trust to declare up to ten percent of the land in its care a 'primitive area'. Such a declaration would legislatively preclude intrusions like aqueducts. Without the pressure from the scientists, the Trust would never have attempted to oppose the giant Snowy Mountains Authority, the 'great development' leader in Australia at the time.

A formal submission to the Kosciusko State Park Trust was prepared early in 1958. It was entitled 'Proposed Kosciusko Primitive Area' and was signed by fifty scientists, including thirty-six from CSIRO, eight from universities and six from other government authorities including the Australian Museum. The majority of these scientists were biologists with at least some ecological interests. The submission was quite explicit. The declaration of a primitive area was a scientific matter: 'the views of scientists should be presented on the location and management requirements'.[34] The document also proclaimed that:

> successful management of the primitive area must be based upon sound ecological principles. To ensure this the scientists who have given their support to this submission are prepared to co-operate fully with park authorities in future management.[35]

The ecologists here represented the 'radical' view, taking on the biggest development scheme in Australia's history. Conservation in the 1950s *was* ecology, not just for the scientists, but also for the wider community. Organisations such as the Wild Life Preservation Society of Australia in its popular magazine *Australian Wild Life* in 1958 and 1959 strongly endorsed the right of scientists to take a leading role in matters of environmental management.

Although Costin and other activists appreciated the aesthetic values of the high country, these values were not used in the appeal for the preservation of the Kosciuszko Tops. The campaign was for the preservation of sites suitable for scientific

study because of their 'naturalness'. Geological and vegetational sites were foremost in the appeal, not the scenic beauty of the area. In 1950s Australia an 'objective argument' based on science was seen to be the way to apply radical political pressure.

The conservative Australian Academy of Science supported the campaign to preserve the 'primitive' aspects of Australia's highest mountains, though it distanced itself from the strongly worded 1958 proposal, preferring to make separate statements on the subject. The Academy had already published a general report on the High Mountain Catchments of New South Wales and Victoria, edited by John Turner, who was one of its Fellows.[36] This publication was followed by articles in the *Australian Journal of Science*.[37]

The scientists' campaign was successful: the Spencers Creek dam was never built. Their 'victory' was also couched in scientific language: the 'important glaciological sites' around David Moraine and Mt Twynham were spared inundation. The fact that aqueducts are very unsightly was almost certainly the key to the hearts of the campaigners, but this was not mentioned. The parameters of the debate were scientific, ensuring scientific hegemony over the discussion. Perhaps, too, the scientists were aware of their political credibility within the Snowy Mountains Authority itself. The Authority's 'conservation conscious' image, bought at some expense through the funding of the Alpine Ecology Unit would have been seriously tarnished by an open rift with the senior scientific community.

Although it was a grand victory for science and the mountains, the 'primitive area' decision was not advantageous to Costin personally. He was a signatory of the 1958 report, and his Snowy Mountains Authority–sponsored work informed the Turner report. As he put it: 'The SMA [had] plugged in quite a bit of money until that primitive area thing came out and they promptly scrubbed the money [for the Alpine Ecology Unit]'.[38] Costin thought he was going to lose his job but at the last minute CSIRO found the money to continue his appointment. Costin was grateful to stay in Canberra as a major move would have been very difficult for him at that time with six children under five—including triplets and twins. The federal government, by underwriting the Alpine Ecology Unit through CSIRO, also indirectly 'bailed out' the conservation conscious image of the Snowy Mountains Authority. The rift between conservation scientists and the Authority never reached headlines.

Conservation as Applied Ecology

The campaigns of the 1950s established the right of scientists to speak on behalf of nature. The science of ecology emerged throughout the western world in the late 1960s and early 1970s as the 'voice of nature'. But the 'age of ecology' and the ecological movement were part of a wider counterculture, rather than something which emerged directly from the science. Nonetheless, some scientific ecologists welcomed the new popularity and sought to embrace it as a new phase of the 1950s conservation movement. In 1965, the Oxford ecologist H.N. Southern expressed concern about the 'dangerous' increase in population and the corresponding diminution of resources, and sought a 'wise principle of coexistence between man and nature', mediated by scientific

ecologists. Southern argued that this principle was 'conservation' and conservation was 'applied ecology'. The definition of the population/resource problem as 'ecology' translated directly for Southern into a justification of more funds for (scientific) ecological research.[39] The massively well-funded International Biological Program's (IBP) effort in ecology was justified by a similar logic.

The treating of conservation and ecology as synonymous was common throughout the western world. It was particularly strong in Australia because it reflected the fact that scientific ecology had strong continuing links with agencies of natural resource management. The conflation of the terms was often politically convenient for practitioners of both. The CSIRO ecologist Francis Ratcliffe, for example, who was a prime mover in the establishment of the ACF in 1965, firmly believed that conservation was science, and that the science of ecology was central to all conservation decisions. He was puzzled when he sought scientific advice on the question of whether Lake Pedder in Tasmania should be flooded, and discovered that none of the Executive of the Tasmanian Conservation Trust were scientists. He was so convinced of the identity of conservation and science that he sought to keep the ACF at arm's length from the Lake Pedder debate until he could get advice from a reputable scientist on the subject.[40]

Radical ecology brought with it the need to consider cultural and aesthetic arguments, as well as democratic participation in conservation debates. The forestry professionals felt this change most acutely and struggled to justify their place in a debate where all the parameters seemed to change overnight. In Australia, Richard and Val Routley's book of 1974, *The Fight for the Forests*, was the catalyst for admitting values other than scientific and economic to debates about forestry practice. Foresters were appalled by the book which criticised clear-felling on both scientific and aesthetic grounds and questioned the extensive planting of *Pinus radiata* sponsored by the Commonwealth government. The book was very unpopular with the forestry establishment. The Routleys claimed they were subjected to intellectual suppression (through limited library rights) by the Australian National University's School of Forestry.[41] This new 'war' with foresters, seemingly on the 'wrong side', was a source of particular tension for many ecologists. Foresters and ecologists often worked together. Some, like Peter Attiwill, belonged in a sense to both groups. Attiwill trained as a forester and paid back a bond to the Victorian Forests Commission in order to pursue a doctorate in ecology in the United States of America. The perceived oppression of foresters by radical environmentalists has angered and politicised some practising ecologists to take backlash positions.

Other ecologists feel flat, de-politicised and disempowered. The networks of the new environmentalists do not privilege them as senior scientific ecologists in the way the utilitarian conservation networks did. It was not the fact that ecology was being directed towards 'quality of life' concerns that disturbed them. Many of them had always understood it in those broad terms, even if they used scientific jargon to mount their political arguments.

In the late 1980s, the Australian Academy of Science sought to weigh into the debates about the environment through a series of conferences sponsored by the distinguished international virologist Professor Sir Frank Fenner and his wife, Mrs Bobbie Fenner. Fenner is not an ecologist, but his interest in ecological matters dates back to

the 1950s and earlier.[42] He has a direct lineage with the 1950s scientific activists, as he was Secretary, Biological Sciences in the Academy of Science in 1958 when the Kosciuszko Tops debate was at its peak. Fenner's recent involvement has tended to emphasise 'science' as opposed to professional ecology, and suggests another route by which scientists can assert hegemony in environmental discussions. Under the auspices of the Academy, the environment becomes a subject for the generalist scientist rather than the ecologist *per se*.[43]

Some ecologists, too, saw their environmental activism as part of their role as scientist in general, rather than ecologist in particular. They were comfortable with the notion of science as an important cultural activity, and their visions of its role in society were informed by this. Eminent Melbourne ecologist David Ashton, for example, commented:

> I think that the science of ecology is so fundamental that we have to, in our urban environments anyway, take in not only the economics but the sociology, all the interactions in the human level (which) have been mirrored in the animal and plant level. … We need things to support us. We need open spaces. We can't just have a concrete jungle or you get people going nuts … we've got to take cognisance of our human ecology—our relation to our environment, and this is a man-made environment, so we have to think about how we react to it.[44]

Ashton, however, has serious reservations about radical ecology and the green political movement. The shift in the definition of 'experts' and the revised power relations has left him concerned that the decisions are now out of the hands of science, something he regards as undesirable. His views mirror those of his mentor, John Turner, whose own scientific activities were inextricably linked with concerns about the social fabric and education. But Turner was 'too busy' to spend the time attending flat-hierarchy committees which shared power in a 'democratic' way and this led him to join the spate of resignations from the ACF in 1973.[45] Fundamentally, Turner and Ashton assumed that their scientific authority gave them a cultural status that should be trusted. Their difficulties were not with the political and cultural resonances of science, but with a new environmental movement that demanded popular participation in framing the activist agenda.

The science of ecology in Australia has been nurtured in a strongly utilitarian context, and many practising scientists have taken for granted its domination by conservation science professionals. The culture of bureaucracy contrasted sharply with the 'public participation' demanded by the green political movement, and this contrast has contributed significantly to the discomfort of practitioners who saw the media identifying the term 'ecology' with new environmental politics. Australian ecologists have seen profound structural changes in a short time. They were the radical reformers in the 1940s and 1950s and the central experts in control of the government's conservation agenda in the 1960s and 1970s. Many, however, feel only marginality and frustration in the 1980s and 1990s.

The deep suspicion of science and technology that is associated with 'radical ecology' makes rapprochement between 'utilitarian scientists' and 'environmental activists' difficult in the 1990s context. The caricature of the 'greenie' as 'anti-science' does

harm to both parties. One retired forester put it heatedly '[greenies] are just bloody ratbags … but they're the ones the governments are listening to'.[46] The polarised and oppositional relations between greenies and foresters that emerged in the 1980s mask their shared heritage and this is regretted deeply by those with sympathy for both. Since the green revolution, many ecological scientists have felt reduced to mere 'informants', or worse, unconsulted, witnessing rather than shaping and participating in debates. Environmental historians can ensure that the historically deep links between scientific conservation and radical ecology are not forgotten. Identifying a common heritage may lead to a more thoughtful and precise analysis of what aspects of the 'system' are problematic for the Earth.

<div align="center">N O T E S</div>

1. Statistics from the *Year Book of the Commonwealth of Australia*, 1944–1945 (no. 36), and 1961 (no. 47), pp. 455 and 290, respectively. Australian population growth has continued, though with significantly less jingoism since the 1970s. The 1997 population is about eighteen million.

2. Dingle and O'Hanlon (1996).

3. Collis (1990), pp. 35–38: also McHugh (1989). The 'official' Snowy Mountains Authority history of the scheme is Wigmore (1968). The federal government drove the scheme through against the wishes of the New South Wales government, in particular, but by the late 1950s, it had the blessing of all the States affected by it.

4. Collis (1990), p. 40.

5. Borthwick (1990) related this memory as part of what motivated him to set up Victoria's first Ministry of Conservation in 1973. See also Lake (1987).

6. (F.G. Elford), 'Ped' (1945), p. 351.

7. This phenomenon is well documented for both the United States (Nelkin 1971, 1975, 1977, 1987) and the United Kingdom (Sheail 1987, esp. pp. 224–262).

8. Mitman (1995).

9. Gottlieb (1993), p. 79.

10. For more on the structure of the discipline of ecology in an earlier period, see Robin (1997). There is an established literature about the effects of isolation on Australian science, especially physics. Examples include Home (1984); Jenkin (1985); Chambers (1991).

11. General Source: *The Commonwealth Universities Yearbook, 1993*. Further details were ascertained (in August 1994) by a brief survey of relevant university departments. Only Monash University in Australia has a department of 'ecology' (created by a merger of Botany and Zoology in 1990, and entitled 'Ecology and Evolutionary Biology'). [Professor J. Warren, Chairman of Ecology and Evolutionary Biology, letter to L. Robin, 23 August 1994]. Only two professorial chairs (at other universities) are earmarked 'ecology'. At the University of Sydney there is a Chair of Experimental Ecology established in 1992 as a personal chair for A.J. Underwood, and named by him. [Professor R.G. Hewitt, Dean, Faculty of Science, letter to L. Robin, 28 August 1994]. In the same year, a Chair of Ecology was established at Griffith University in Queensland (occupied by Professor Roger Kitching). [D. Smith, Faculty of Environmental Sciences, letter to I. Robin, 26 August 1994].

12. Specht (1981), esp. p. 410.

13. Cittadino (1980), p. 191.

14. Cited by Bowler (1992), p. 365. Another example was Moore (1920).

15. In the 1950s, State-funded soil conservation agencies and also CSIRO Wildlife Survey branch (later the Division of Wildlife and Ecology) and the Alpine Ecology Unit were all important supporters of ecological research. Departments of agriculture and forestry were also important. While conservation is not the 'primary mission' of CSIRO, the rabbit research of Wildlife Survey and the soil conservation work of the Alpine Ecology Unit were central to those particular branches. In the period since the 1950s, the (state and federally funded) national parks services have also become important employers of ecologists.

16. Osborn (1925); Osborn et al. (1932); Robertson (1986), pp. 116–119.

17. Gillbank (1991, 1993); Robin (1993b), pp. 229–240.

18. This information is based on A.B. Costin's *curriculum vitae*, supplied to Libby Robin at the time of interview (19 April 1994).

19. Gillbank (1991; 1993).

20. Formerly Mt Kosciusko.

21. Breckwoldt (1988), pp. 100–105; Griffiths and Robin (1994), p. 7.

22. Costin (1994), Tape 1, side B.

23. In 1955 he prepared a major report to Victoria's Land Utilization Advisory Council on the detrimental effects of cattle grazing in the Bogong High Plains. (See Gillbank, 1991, pp. 32, 38).

24. Costin (1954): Breckwoldt (1988).

25. Griffiths (1996).

26. One recent critic is Lawrence (1990, 1992, 1994).

27. The term 'Kosciusko School' was used by Williams (1985) in the acknowledgements for his thesis. Many other students have received informal support from Costin and his associates. (Roger Good, personal communication, April 1994).

28. This resulted in a series of papers on the catchment hydrology of the area: Costin et al. (1959, 1960, 1961a, 1961b, 1964).

29. Griffiths and Robin (1994).

30. Harasymiw (1991); Costin (1994); Griffiths and Robin (1994).

31. Wigmore (1968), pp. 61–62.

32. Glaciological work had been undertaken in this area by Edgeworth David and others since the first decade of the twentieth century. (Browne 1914, 1943; Jennings and Costin 1977).

33. Breckwoldt (1988), pp. 95–99.

34. 'Proposed Kosciusko Primitive Area', roneoed typescript, Australian Academy of Science Archives, Canberra [File No. 1002, National Parks Committee], p. 3.

35. Ibid., p. 2.

36. Turner (1957).

37. Australian Academy of Science (1961); Browne et al. (1965).

38. Costin (1994).

39. Southern (1965), pp. 6–7.

40. Robin (1994a).

41. Routley and Plumwood (1986). Val Routley now writes as Val Plumwood. Richard Routley later changed his name to Richard Sylvan.

42. Fenner (1989) comments that his interest in the environment began when he accompanied his father, Charles Fenner, on geomorphological trips in his childhood from 1928 onwards. In the same paper, however, he comments that his concern with the role of science in the management of the environment began in the Academy of Science, and continued through his involvement in the establishment of the Centre for Resource and Environmental Studies (CRES) in Canberra (p. 3). Also discussion with Libby Robin, 21 April 1994.

43. The Fenner conferences have considered the Australian Alps National Parks in 1988 (Good 1989), Protection of Marine and Estuarine Areas in 1991 (Ivanovici et al. 1991), the Conservation of Biological Diversity in Australia in 1992 (Australian Academy of Science 1993) and a Conservation Strategy for the Australian Antarctic in 1993 (Handmer and Wilder 1993).

44. Ashton (1991), p. 23; Also discussion, 10 March 1994.

45. Robin (1994b).

46. Middleton (1990), p. 16.

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The Political Ecology of Deforestation in Honduras

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> I can only expect destruction for my family because I am provoking it with my own hands. This is what happens when the peasant doesn't receive help from the government and the banks—he looks for the obvious way out which is to farm the mountain slopes and cut down the mountain vegetation. Otherwise how are we going to survive? We're not in a financial position to say, "Here I am!—I would like a loan to plant so many hectares!" I put in my request but the banks don't want to give me credit because I cannot guarantee to cover the loan. I know what I am doing—as a person I know. I am destroying the land.
>
> —*Honduran peasant, 1990*

Ameliorating global resource abuse will require what we term a *political ecology* of development.[1] Political economic perspectives traditionally have focused on understanding the tension between the government and the market, or on the interaction of the pursuit of wealth and the pursuit of power, as means of organizing human society (e.g., Gilpin 1987:11). In these conceptions the ecological effects of these processes have not been of much concern (Redclift 1984, 1987). In contrast, the political ecology approach looks at how the government and market interact to transform the environment and pursues questions of how political means may be applied to ensure that humans develop symbiotic, rather than destructive, relationships with the natural environment. By assuming that natural environments or ecosystems are in large part social constructs, political ecology also significantly expands much ecological analysis.

This essay uses a political ecology approach to examine the problem of deforestation and other abuses of natural resources in Honduras. The political ecological analysis includes an examination of the interconnections among the dominant export-led development model, the ongoing economic crisis, the policies and actions of

the state, the competition among various classes and interest groups, and the survival strategies of an increasingly impoverished rural population. An examination of the Honduran case indicates that deforestation cannot be understood apart from the associated social processes and suggests that what is happening in Honduras is representative of processes occurring throughout the Central American isthmus. Analysis begins with southern Honduras, one of the most densely populated regions of the country and an area in which natural resources are most threatened.

We will show that

1. Although deforestation in Honduras has many immediate causes, the roots lie in misdirected development strategies that have emphasized export-led growth.
2. Development in the region has in fact exacerbated structural inequalities and extremes of wealth and poverty that have intensified resource abuse throughout the country.
3. Governments (especially the United States in collaboration with the government of Honduras) and bilateral and multilateral aid and lending organizations are exacerbating resource destruction by focusing solely on short-term needs to generate foreign exchange and so-called development, defined only in terms of economic growth.
4. Reversing deforestation and other resource abuse will require an altered development agenda that directly addresses extremes of wealth and poverty and other issues of social and environmental justice.

Development Trends in Honduras

Except for the banana industry established at the turn of the century along the relatively isolated north coast, extensive agrarian capitalism in Honduras did not arise until after World War II during a period of temporarily high prices on the world market for primary commodities like cotton, coffee, and cattle. At that time the industrialized countries promoted capitalist enterprises through increased foreign investment, and national security interests prompted the U.S. government to expand programs of economic and military assistance. The Honduran government became an active agent of development, creating a variety of institutions and agencies to expand government services, modernizing the country's financial system, and undertaking a number of infrastructural projects (Stonich 1993). With the infrastructural improvement, landowners and investors in the southern part of the country found it profitable to expand production for the global market, and southern Honduras was firmly integrated into national and international markets for the first time. Since then diversification and growth of agricultural production for export have characterized the southern Honduran economy. With financial assistance from multilateral and bilateral development and lending institutions (most important: the United States Agency for International Development [USAID], the World Bank, and the International Monetary Fund [IMF]), cotton, then sugar and livestock were the primary commodities first promoted in the south. By the mid-1970s these products were supplemented by

sesame and melons and later by a wider variety of so-called nontraditionals, especially cultivated shrimp (Stonich 1991a, 1992, 1993).[2]

The Honduran government's continued efforts to expand export agriculture are more understandable, given Honduras's extreme economic dependence on agriculture and its continued economic crisis. Honduras remains predominantly an agricultural country; in 1990 agriculture generated about 30% of its gross domestic product, 75% of export earnings, and 55% of employment (Comisión Nacional 1992:67). Indications of the international economic crisis emerged in Honduras in 1981 and intensified through the end of the decade. Productive activity declined drastically, unemployment intensified, and inflation deepened. The balance of payments and the national treasury suffered imbalances, and the real income of a large proportion of the population declined. Honduras was significantly constrained in supplying imported materials, and private investment dropped as a result of the region's political and social problems and disturbances in exchange and monetary systems. This situation was aggravated by the economy's vulnerability to external fluctuations, which affected the demand and price of its most important traditional export products such as bananas and coffee (Stonich 1993).

By 1989 the Honduran external debt of U.S.$3.3 billion was 120% of the annual gross domestic product—larger than the per capita debt of either Brazil or Argentina (Daniels 1990). By late 1989 all the major financial lending institutions (the World Bank, International Monetary Fund, and Inter-American Development Bank) had placed Honduras on the list of countries that were ineligible for new loans because of overdue payments on earlier credits, as well as because of the Liberal government's reluctance to continue its economic adjustment program. Also in 1989, for lack of what it perceived as a sound economic reform program, USAID did not release U.S.$70 million that had been approved to support Honduras's balance of payments.[3]

Economic liberalization was a central component of the platform of the National party, which came to power in early 1990. One of President Rafael Callejas's first actions was to declare the nation bankrupt. Barely a month after taking office Callejas, with the support of his new legislative majority, passed a major reform of the Honduran economy that was both in line with the demands of major creditors and designed to make Honduras more attractive for investors and hence promote exports: the national currency (the lempira) was devalued by 100%, and a crawling peg rate of exchange was adopted; protective import tariffs were slashed from 135% to 20%, and investment regulations—both for foreigners and national entrepreneurs—were simplified.

Fiscal deficit reduction actions included decreased public spending (achieved in part by laying off approximately ten thousand government workers, about 20% of the government's employees, in January 1991), elimination of subsidies, increased water and energy tariffs, and modification of prices to actual market values. The exchange rate of the lempira (per U.S. dollar) rose from 2.0 before the devaluation to 3.5 immediately afterward, to 4.9 by July 1990, and to 5.5 by July 1991. Inflation during the twelve-month period of May 1990 to May 1991 was 38.7%. The ensuing rise in the cost of living further hurt the economic circumstances of the most vulnerable sectors of Honduran society, whose minimum wages remained unchanged and who were also

most affected by the sharp rise in unemployment. Despite the apparent effects of the severe structural adjustment program on the poor and the presidential election of 1993, which returned control to the Liberal party, the ongoing economic crisis makes it highly unlikely that the national government will direct its policies away from attempting to expand export production (Stonich 1993).

In this critical time the natural resource base of the country has come under severe pressure. Honduras is highly dependent upon renewable natural resources to generate income from agriculture, forestry, and fisheries. Natural resource-based commodities were the principal means of earning foreign exchange, providing more than 80% of export earnings throughout the 1980s (World Bank 1984–94). During the fiscal crisis grappling with the repayment of growing external debt has been more important to the Honduran government than conserving natural resources. Raising cotton, cattle, melons, and shrimp draws international financial assistance and helps meet foreign exchange requirements—whatever their social and environmental costs.

The Status of Honduran Forests

During the 1980s Latin America's average annual rate of deforestation was the highest in the world (approximately 1.3% of existing forests were lost annually). This overall rate was exceeded within Central America, which underwent estimated annual losses of 1.6% during the period (World Resources Institute [WRI] 1990:42). During the same period average forest loss in Honduras was appraised at 2.3% annually (WRI 1990:42). Table 27.1 compares the results of an inventory of Honduran forests compiled by the Food and Agriculture Organization of the United Nations in 1964 with a similar inventory completed in 1986 by the parastatal Honduran Forestry Corporation (Corporación Hondureña de Desarrollo Forestal (COHDEFOR) in charge of forest management. It reveals a total loss of forests of 26% (approximately 1.76 million hectares) from 1964 to 1986 and shows that the greatest loss was in broadleaf forests (34.8%) compared to pine forests (12.5%).

In general, rapid rates of deforestation of broadleaf forests first occurred in the southern part of the country in what were primarily tropical dry deciduous forests but more recently have accelerated in the tropical humid forests located in northeasterly portions of the country. The recent *Environmental Profile of Honduras—1989* identifies the principal causes of deforestation (in upland and noncoastal zones) as

TABLE 27.1
Forest Loss in Honduras, 1964–86 (in Thousands of Hectares)

Type of forest	FAO in 1964	COHDEFORE in 1986	Forest loss	Percentage in 22 years	Annual deforestation
Pine forest	2,739	2,397	(342)	12.5%	16
Broadleaf forest	4,072	2,654	(1,418)	34.8%	64
Totals	6,811	5,051	(1,760)	47.3%	80

SOURCE: Corporatión Hondureña de Desarollo Forestal (COHDEFOR 1988), FAO is the Food and Agriculture Organization of the United Nations.

1. Rapid population growth, which led to cultivation of increased marginal land and to an expansion of the agricultural frontier
2. Inefficient and wasteful lumbering practices
3. Lack of supervision and control by COHDEFOR
4. No local incentives for protecting and conserving forests, which translates into indifference on the part of the population
5. Unequal and insecure land tenure
6. No clear national forestry policy
7. Entrepreneurs unaware of the need to manage forest resources in an orderly and sustainable manner
8. Failure by the government to implement a systematic and persuasive education campaign to create public awareness of the necessity to protect and use the forest resources rationally
9. Instability in the group of public administrators that decides forestry policy
10. Lack of an agrarian reform law that takes into account forest management and the rational use of forest resources (Secretaría de Planificación [SECPLAN] and USAID 1989).

There also has been increasing concern about degradation of coastal zones, especially the significant loss of ecologically vital mangrove forests and associated ecosystems in areas surrounding the Gulf of Fonseca (SECPLAN and USAID 1989; Stonich 1991a, 1992, 1993; Foer and Olsen 1992; International Union [IUCN] 1992; Vergne, Hardin, and DeWalt 1993). According to the recent *Environmental Study of the Gulf of Fonseca* (Vergne, Hardin, and DeWalt 1993), the area in high-quality mangrove stands declined by about 6,760 hectares (22%) since 1973. Of this total, approximately 2,132 hectares (32% of the total area lost) was the direct result of the construction of shrimp farms. An undetermined amount of loss can also be indirectly attributed to the expansion of the shrimp industry because road building and pond construction lead to changes in hydrology.

The remaining mangroves are lost to a combination of factors, including the construction of salt-making ponds, the cutting of trees for fuelwood and construction materials, and the gathering of bark from red mangroves for the tanning industry (SECPLAN and USAID 1989; IUCN 1992). For example, approximately 46,300 cubic meters of mangrove fuelwood, equivalent to the loss of 250 to 350 hectares of forest, are used annually (Flores and Reiche 1990). An undetermined but probably significant amount of mangrove destruction can also be attributed to the increased sediment loads carried by freshwater runoff from mountainous watersheds and deposited in coastal zones. Highland deforestation and intensive agriculture on steep hillsides have produced extremely high rates of soil erosion and excessive sedimentation.[4] The destruction of mangrove areas, along with the disappearance of seasonal lagoons, deteriorating water quality, and a declining gulf fishery have precipitated widespread social conflict and placed southern Honduras in the center of increasingly violent confrontations between opposing interest groups (Stonich 1991a, 1993; Vergne, Hardin, and DeWalt 1993; Stonich, Murray, and Rosset 1994).

Government Policy Regarding Forestry Management

In part because of increased concern over the clear-cutting of upland forests by foreign lumber companies, the Honduran government began to assume a greater role in forestry resource management in the early 1970s. The principal laws governing forest management were enacted: Decree 85, the Forest Law, which outlined national forest conservation and management requirements, and Decree 103, which created COHDEFOR as manager of the nation's forests (USAID 1982). The specific mandate of COHDEFOR was to halt clear-cutting by foreign companies and to regulate the extraction and marketing of forest products in order to generate income to finance various government development programs. To accomplish this the Honduran government in effect nationalized the forests.

Although the government was given exclusive ownership of Honduran forests, new or existing groups of farmers living in the forest were considered (at least on paper) the chief means of executing programs to conserve and regenerate the forests. Established within COHDEFOR was the national Social Forestry System (Sistema Social Forestal), the goal of which was to promote the formation of farmer cooperatives or other groups to protect forests by preventing fires, overgrazing, illegal cutting, and the expansion of pasture and shifting agriculture. In addition to supporting cooperatives, COHDEFOR created government-sponsored forest-management zones (areas of integrated management—AMIs) on large forest tracts that were allocated to specific community level groups. The government provided technical advice, materials, and markets, and rural people were to supply the labor. Although by 1987 fifty AMIs had been established, in reality neither the forestry cooperatives nor the AMIs ever received much financial or technical assistance from COHDEFOR (SECPLAN and USAID 1989).

In the wake of passage of laws 85 and 103 a number of serious problems arose, especially regarding enforcement. Among the most crucial were lack of clearly defined forestry policies, regulations, and guidelines, lack of coordination and communication both within COHDEFOR and between COHDEFOR and the many other institutions that affect the management of forestry resources (including several government agencies and ministries as well as organizations of farmers and ranchers), and inadequate execution of plans and decisions. These difficulties resulted in making COHDEFOR a vast, unwieldy, and indecisive bureaucracy and contributed to the uncontrolled and ecologically unsound exploitation of Honduran forests (USAID 1982; SECPLAN and USAID 1989).

SECPLAN and USAID (1989) identified the failures of the national Social Forestry System, as well as the far-reaching powers and inadequate management of COHDEFOR, as among the principal causes of deforestation. In response, the government of Rafael Callejas significantly revised its natural resource policy (Johnston et al. 1990). Preliminary measures included ending COHDEFOR's monopoly on wood exports and doubling stumpage fees in order to discourage overexploitation of forests. Although the government maintained that it was committed to conserving Honduras forests, in 1992 it attempted to enter into a preliminary forty-year contract with the Stone Container Corporation of Chicago to establish a pine plantation and chip mill in La

Mosquitia, the last remaining large area of tropical humid forest in the country (Honduran Popular Action Group 1992). Only widespread public resistance by national and international environmental groups thwarted that effort.

Later the same year, however, Honduras passed the Law for the Modernization and Development of the Agricultural Sector (Decree 31–92), which included controversial forestry provisions (passed in 1993). The law stripped COHDEFOR of all authority except its supervisory and enforcement powers (which remain important) and gave the right to cutting and commercial forest production only to private persons or entities. In addition, companies engaged in various facets of commercial forestry could include foreign owners, partners, and investors and could use foreign capital without limitation (Fandell 1994). Thus shortly after rejecting Stone Container's proposal in response to national and international environmental protests, the government enacted legislation that opened Honduran forests to forestry corporations all over the world. Nor were Stone Container Corporation's efforts to establish a new plantation and mill in Central America blocked. After failing to reach agreement with the Hondurans, the company began negotiations to transfer the operation to the Punta Estrella rain forest in Costa Rica (Scanlan 1994).

Protection and management of mangrove ecosystems received legal status in Honduras through the articles of the Fisheries Law of 1959, which prohibit clearing of mangroves on shorelines, and the Forestry Law of 1958, which declared mangroves protected forestry zones. Although modified by subsequent forestry laws (most important was the creation of COHDEFOR in 1974), the effectiveness of national forestry legislation has suffered from the lack of clear operational directives and shortages of trained staff (Vega 1989). With regard to aquaculture development and mangrove areas, the Honduran government has administrative authority over lands that lie between high tide and a point 2 kilometers inland. Until recently the government exercised this mandate through the Honduran Institute of Tourism, but it has been assumed by the Ministry of Natural Resources. Despite this chance to directly influence the effects of shrimp-farm expansion on mangrove zones, the agency has established no direct link between the granting of concessions for farm construction and requirements for mangrove protection (in part because of the lack of clear procedures governing concessions) (Vergne, Hardin, and DeWalt 1993:22–23).

Southern Honduras: Environment and Demography

Southern Honduras is located in tropical dry and subtropical moist forest zones between the borders of El Salvador and Nicaragua (Holdridge 1962). The zone includes the departments of Choluteca and Valle and has a total surface area of about 5,757 square kilometers, about 5.2% of the national territory. Three major geomorphic areas can be defined within the region: the coastal zone, the plains, and the highland (mountains). The coastal area of the south that lies adjacent to the Gulf of Fonseca provides Honduras with its only access to the Pacific Ocean. This is an area rich in biodiversity—extensive stands of mangroves, seasonal lagoons, estuaries, mud flats, and enclaves of dry tropical forests. The coastal mangrove forests, estuarine waters,

and wetlands generally have a high biological productivity and serve as nursery areas for many species of finfish, shellfish, and crustaceans.

Beyond the mangrove forests lies one of the few extensive plains on the Pacific coast of Central America. The plains can be divided into two zones, an alluvial sedimentary shelf that stretches from the coastal area to 15 meters above the mean high-tide mark and a higher shelf that continues as much as 200 meters above the high-tide mark. This savanna gives way to steep foothills, which quickly become the jagged mountain ranges that form a broad base to the northeast and comprise the majority of the region. Although these volcanic mountains rarely reach altitudes of more than 1,600 meters, they are exceedingly rugged and form myriad isolated valleys.

Remnants of tropical dry forest occur inland from the coastal zone. Such tropical deciduous forests are found in areas where marked seasonality of precipitation predominates and were once prevalent along the entire Pacific coastal plain of Central America. Although deciduous forest once represented the dominant vegetation type in the lowlands of the Pacific coastal region of southern Honduras as well, agriculture (crops and cattle) has almost completely eliminated it. Only a few fragments remain, mostly as scattered gallery forests along streams and rivers.

Pine and oak associations, corresponding to Leslie R. Holdridge's sub-tropical moist forest (1962), occur at altitudes of 600 to 1,800 meters. Predominant species are oak (*Quercus*) and pine (*Pinus oocarpa*) at lower elevations and pine (*Pinus psuedostrobus*) at higher elevations of the zone. Understory varies from grassy cover to low shrubs and tall grasses. Slash-and-burn agriculture, cattle grazing, cutting of trees for fuelwood and construction, and commercial logging of pine for export have greatly modified this habitat.

Islands of cloud (montane rain) forest are found at elevations of 1,350 to 2,300 meters; the almost daily cloud build-up and the lower evaporation rates on mountain peaks provide moisture for the lush plant growth. These highland broadleaf forests generally are surrounded at lower elevations by pine and oak forest. Cloud forests are important in the regulation of surface and groundwater supplies for drinking, irrigation, and hydroelectric power production. Because of their rugged terrain many of these cloud forests remained fairly intact until the 1980s. However, they are being seriously degraded as increasing populations of desperately poor farmers expand slash-and-burn cultivation to these formerly remote areas.

Adding to these environmental concerns has been the considerable climatic instability of the last few decades (Stonich 1993:36). In a region characterized by erratic precipitation the 1980s were marked by the worst drought in fifty years and accompanied by an increase in median ambient temperature of 7.5 degrees centigrade (Almendares et al. 1993). The growing ecological crisis in the region has not only increased the agricultural risk, especially for small farmers, but has also altered the distribution of vector-borne diseases affecting people, crops, and other crucial species. (Comprehensive Resource 1984; Stonich 1986, 1989, 1993; SECPLAN and USAID 1989; and IUCN 1992 contain more complete discussions of the environmental context and the natural and agricultural potential of the area.)

Demographic Considerations

The rate of population growth in Honduras has been among the highest in the world, averaging 3.1% per year from 1950 to 1974 and rising to 3.4% from 1974 to 1988 (Stonich 1993:40). In 1990 the population of Honduras was estimated at 5.1 million, nearly double the 1970 population of 2.63 million (World Bank 1992:268). Although the total fertility rate for Honduras dropped from 7.4 births per woman in 1970 to 5.4 in 1989, and the annual growth rate declined to 2.96% by 1990, the country's population continues to grow rapidly, and the population is expected to reach 6.2 million by the year 2000 (SECPLAN 1991:206).

Persistently high rates of population growth have been accompanied by escalating population densities nationally: from 12.2 people per square kilometer in 1950 to 39.1 in 1988 (Stonich 1993:41). Southern Honduras is the most densely settled region of the country, comprising only 5.2% of the total national land area but approximately 9.3% of the population (Stonich 1989:277). Population density remains well above the national average, climbing from 29.8 persons per square kilometer in 1950 to 72 in 1988, with population densities near 150 people per square kilometer in some highland municipalities (Stonich 1993:41).

Although population densities continue to be significantly higher than that of the nation as a whole, since 1950 the rate of growth in the south has not been as high as in other areas of the country. This is primarily the result of extensive out-migration from the region and in part the result an infant mortality rate that is higher than the national average. Almost half of all people born in the region migrate to other parts of the country; the most popular destinations are the capital city of Tegucigalpa, the industrial center of San Pedro Sula, and the rural "agricultural frontier" areas in the northeastern part of the country. Considerable migration from rural to urban areas of the south (the cities of Choluteca and San Lorenzo) also is occurring. Despite migration to urban centers within the region, the south remains more rural than the country as a whole, with three-quarters of the population living in rural areas in contrast to 60% nationally (Stonich 1991b, 1993).

Agrarian Transformation and Ecological Consequences

The Cotton Boom

It was cotton cultivation that first transformed traditional social patterns of production in southern Honduras (Stares 1972:35; Durham 1979:119; Boyer 1982:91). Although cotton had been grown in the area since preconquest times, large-scale commercial cultivation of cotton was introduced in the late 1940s and 1950s by Salvadorans who brought seeds, chemicals, machinery, and their own labor force into the area. Salvadoran farmers secured Honduran bank loans, rented (or purchased) large tracts of land from Honduran owners, and began commercial production. They were joined by Honduran farmers who first began producing on a minor scale but who by 1960 expanded production and formed their own ginning and marketing cooperative. When the Salvadorans were expelled from the country after the Salvadoran-Honduran War

in 1969, their property was confiscated and became available to the Honduran growers (Stonich 1986:118).

As in El Salvador and Nicaragua commercial cotton cultivation in Honduras involved considerable mechanization in land preparation, planting, cultivation, and aerial spraying and was dependent on the heavy use of chemicals (especially insecticides and fertilizers).

The indiscriminate use of pesticides in the cotton-growing regions remains among the most pervasive environmental contamination and human health problems throughout Central America (Central American Institute [ICAITI] 1977; Weir and Shapiro 1981; Bull 1982; Botrell 1983; Boardman 1986; Williams 1986; Leonard 1987). Water from cotton-growing areas of southern Honduras shows heavy contamination from DDT, dieldrin, toxaphene, and parathion (USAID 1982). A 1981 study of the levels of pesticide poisoning in the area around the city of Choluteca, Honduras, revealed that approximately 10% of the inhabitants had pesticide levels sufficiently high to be considered cases of intoxification (Leonard 1987:149). A number of reports show that the land and water contamination from pesticides, as well as high levels of pesticide residues in food supplies, continue to have substantial effects on human health (Williams 1986; Leonard 1987; Murray 1991).

The major social effect of the cotton boom was to increase inequalities in access to land. Large landowners revoked peasant tenancy or sharecropping rights and raised rental rates exorbitantly so that peasants would leave the land. Landowners also laid claim to many wilderness areas and forcibly evicted peasants from national land or from land of undetermined tenure (Parsons 1975; Durham 1979; Boyer 1982:94). Increased cotton cultivation thus displaced many poor farmers from the more suitable agricultural lands in the south. At the same time, however, cotton provided many seasonal jobs during the harvest season, because the long-staple cotton grown in the region was largely picked by hand.

Production of cotton in the south fluctuated considerably before the cotton boom finally ended in the late 1980s. The build-up of pesticide-resistant insect populations and the increasingly high costs of pesticides, combined with low market prices, effectively ended cotton cultivation in southern Honduras. Although attempting to resurrect cotton cultivation using integrated pest management techniques has been discussed, virtually no cotton was planted in the south through 1992.

The Cattle Boom

The expansion of the cattle industry probably had the most extensive and devastating environmental effects in the south. During the 1960s the Alliance for Progress and the growing demand for inexpensive beef by the expanding U.S. fast-food industry helped to fuel a livestock boom throughout Central America.

Honduras increased its export quotas to the United States, implemented development initiatives that stimulated the beef trade and modernized beef production, and instituted credit programs to help expand beef production. From 1960 to 1983 57% of all loans allotted by the World Bank for agriculture and rural development in Central America financed the expansion of beef for export. During that same time Honduras

received 51% of all World Bank funds disbursed in Central America, of which 34% was used for livestock projects (Stonich 1992). This assistance was funneled into the country through institutions and projects controlled by national elites as well as foreign (especially U.S.) interests (Stonich and DeWalt 1989).

In a context of declining agricultural commodity prices, high labor costs, unreliable rainfall, and international and national support for livestock, landowners reallocated their land from cotton and/or grain cultivation to pasture for cattle (Stonich 1986; Stonich and DeWalt 1989). Cattle appealed to landowners in Honduras because cattle can be husbanded with little labor. With only two or three hired hands and extensive pasture a landowner can manage a herd of several hundred cattle. Ironically, land reform programs also encouraged the expansion of pasture for livestock. Landowners who feared expropriation of unused fallow and forest land fenced it and planted pasture to establish use of the land without substantially increasing their labor costs (Jarvis 1986:157; Stonich 1986, 1992).

Large landowners also exploit the growing inequalities in access to land with an inexpensive way to convert land from forest to pasture: by renting hillside land in forest to land-poor peasants (DeWalt 1983, 1985, 1986). These renters cut the forest down in order to plant maize and sorghum, their principal subsistence crops. During the second or third year of cultivation, when land fertility declined, landowners instructed the renters to sow pasture grasses among the maize and/or sorghum. This converted the land, usually permanently, into pasture for cattle. Renters recognize that they are destroying their potential source of livelihood as more fallow and forest land is converted into pasture. They are caught because they have to meet their short-term needs for survival, yet they jeopardize their long-term future by participating in the pasture conversion process. In the words of one small farmer, "Right now we have land available to rent, but each year you can see the forest disappearing. In a few years, it will all be pasture and there will be no land available to rent. How are we to produce for our families then? We see what is happening, but we have no choice because our families have to eat now."

The expansion of pasture caused extensive changes in land-use patterns in Honduras through the 1960s and 1970s. Growth took place in the lowlands and foothills, where cattle raising traditionally occurred, and in the highlands, where many of the wealthier peasant farmers augmented cattle production with income generated by agricultural production (Durham 1979; Boyer 1982; Stonich 1986). Increased livestock production in the lowlands and the highlands accelerated the expulsion of peasants from national and private lands (White 1977:126–156; Stonich 1986:139–143). From 1952 to 1974, for example, pasture in the southern region of the country increased from 41.9% of the land to 61.1% and was associated with the simultaneous and precipitous decline of land in fallow and in forest (Stonich 1989, 1993). Thus both deforestation and serious soil erosion accompanied the cattle boom. It has been estimated that Honduras is losing its forests at the rate of 10,000 hectares per year and, if current trends continue, "the forest resource will be exhausted in a generation" (USAID 1990:3). Most dry tropical forest in the south has already disappeared, and soil erosion rates are alarming.

Local and Regional Consequences of Development

The social consequences of the expansion of the cotton and cattle industries—of economic development—on rural areas of the south have been discussed in detail elsewhere (see White 1977; Durham 1979; Boyer 1982; Stonich 1986, 1989, 1993; Stonich and DeWalt 1989). Briefly, development led to ever greater socioeconomic inequalities of households in the region. Farmers with medium and large holdings sought to improve their competitive position in the world marketplace. Using the international foreign assistance that was channeled through government loans, they tried to cut their costs by investing in commodities and techniques that were labor displacing rather than labor absorbing; they tried to achieve economies of scale by acquiring more land and expanding their operations; and as material costs rose and prices fell for cotton, they increasingly switched their operations to cattle, a commodity that requires small amounts of labor and large amounts of land (DeWalt 1986; Stonich and DeWalt 1989).

The appropriation of land for commercial agriculture and for extensive livestock raising relegated resource-poor individuals to the most marginal areas of the south. Using shifting cultivation systems, peasants in the foothills and highland regions expanded production to steep slopes, interplanting maize and sorghum (their primary subsistence crops) for a few years before leaving the field in fallow to regain its fertility (Stonich 1993). The conversion of land to pasture, combined with the rapid growth of the human population, has increased the pressure on the remaining cropland. During the last several decades fallowing periods in the south have decreased. In some communities fallow periods have been eliminated entirely, whereas in others the fallowing interval has decreased, from fifteen to twenty years in the 1950s to just a few years (Stonich 1993:150–152). This trend toward permanent cultivation has led to depletion of the soil and has exacerbated the soil erosion problems on steep slopes (Stonich 1993:150–152). Thus the landscape of southern Honduras has been transformed in recent decades. The greatly disturbed regional ecology has been left vulnerable to the volatile weather patterns since the mid-1980s and has resulted in extensive flooding, landslides, and watershed destruction.

The concentration of agricultural land, combined with the lack of alternative economic options and growing environmental destruction, led many resource-poor families to seek opportunities elsewhere (Stonich 1991b). Between 1974 and the late 1980s out-migration from the southern region averaged 1.3% annually. Approximately half as many people left the region permanently each year as were added to the population by both its high birthrate and limited in-migration. Many poor families engaged in cyclical or permanent migration to the cities or came to depend on remittances from family members (Stonich 1991b). The urban population growth rate in Honduras was about 5.6% from 1974 to 1987, a rate much higher than the overall national population growth rate of about 3.4% for the same period (USAID 1989b). The expanding squatter settlements on the edges of Tegucigalpa and San Pedro Sula bear witness to the environmental problems caused by this rural to urban migration.

Migrants from environmentally degraded areas in the south also have extended the agricultural frontier by settling in the departments of Olancho and El Paraiso, which

border the relatively unpopulated tropical humid forest region of La Mosquitia in northeastern Honduras. According to the national population census of 1974, the adjacent departments of El Paraiso and Olancho rank behind only the largest cities (Tegucigalpa and San Pedro Sula) as the predominant extraregional destinations of migrants from the south (Stonich 1991b). Community-level research shows that by the 1980s these two departments accounted for more than 50% of the total destinations of male householders from rural highland communities in the south (Stonich 1991b).

The first organized migration of people from the south to La Mosquitia began in the early 1970s, and by the 1980s communities had settled along the entire upper reaches of the Rio Patuca. The colonization of this area of tropical humid forest has extended into the Rio Platano Biosphere Reserve. Replicating processes taking place throughout Latin America, deforestation has taken a heavy toll on ecosystems, as newly arriving colonizers (many using the illegal roads constructed by loggers) clear forest for crops, cattle, and fuelwood, thereby facilitating the expansion of ranching interests and encroaching on the lands inhabited by Honduras's small remaining indigenous population.

Another strategy for resource-poor households is to relocate within the southern region to the relatively sparsely populated coastal region of mangrove, mud flats, estuaries, and seasonal lagoons along the Gulf of Fonseca. Unsuitable for large-scale cultivation of crops, pasture, or most other commercial uses, this area has become populated by increasing numbers of migrants from other municipalities in the south. From 1974 to 1988, a period of substantial out-migration from the southern region as a whole, rural populations in the six municipalities that border the Gulf of Fonseca grew faster than the country as a whole. The families settling the coastal communities survive by exploiting the resources of the coast and the estuaries. They clear the wilderness to cultivate crops but have come to depend as well on fish, shrimp, shellfish, animals, and wood gathered from the surrounding common resource areas—lagoons, mangroves, estuaries, and the Gulf of Fonseca. Until the early 1980s the only major competition for these coastal resources was from commercial salt-making operations.

Since the end of World War II the landscape of Honduras has been transformed through deforestation, overgrazing, changes in agricultural systems, and other environmental stresses. Along with other seriously degraded areas of the world such as Haiti, the Philippines, southeastern Kenya, and Nepal's middle mountains, it has been designated a critically endangered region where basic life-sustaining systems, including water and soils, are threatened (Kasperson, Kasperson, and Turner in press). Environmental decline within the country has been most severe in the southern zone, where semidesertification and growing rural impoverishment have spurred extensive migration to other areas within and outside the zone.

The paradox is that environmental degradation is most serious in an area that has been an important target for a series of economic development initiatives. The political ecology of development in Honduras reveals the interconnections of the dominant development strategy, deforestation (and other forms of environmental destruction), and worsening rural poverty. As part of an overall strategy of export-led growth, a series of nontraditional agricultural commodities has been championed in southern

Honduras since the 1950s. This prevailing development strategy has altered the agrarian structure of the region, exacerbated existing social and economic inequities, and shaped the ways in which natural resources have been exploited.

By fostering economic growth at the expense of human populations and the environment, this strategy has encouraged environmental degradation as well as political instability and violence.

An analysis of the growth of the shrimp industry in Honduras is particularly useful in showing how the latest development trend has advanced the social and ecological processes established with the cotton and cattle booms, spatially as well as temporally, to coastal zones now having greatly enhanced economic value. Diminished access to common property resources, brought about by government-sponsored privatization efforts and encouraged by international agencies, is not a new occurrence in southern Honduras. Nor are enclosure movements, supported by force, that result in rural displacement, repression, and violence.

A political ecological perspective allows analysis of deforestation and other forms of environmental decline and human poverty to go beyond overly simplistic explanations that ascribe blame to particular commodities (e.g., the "hamburger connection"). According to measures of land scarcity, displacement, poverty, and environmental degradation, outcomes have been similar regardless of which commodities have been promoted. Although the specific commodities being promoted vary, the underlying social and economic relations remain the same.

The repetition of these processes through time and through space demonstrates the extent to which these dynamics are part of the structure of Honduran society and tied to the dominant development model.

Political ecological analysis also moves beyond a fixation on population growth as the only, or the most important, factor in explaining environmental degradation. The political ecological approach demonstrates that blaming the population increase for environmental degradation in the region is too facile and diverts attention from the complexity of issues facing the region and from a more comprehensive explanation.

Although the rapid increase in population growth in the region is a matter for serious concern, population growth per se cannot adequately explain the destructive land-use patterns that have emerged. Although population growth may be a part of the explanation for some environmental problems, the nature of agricultural development in the region is more responsible for most problems. Development in the region has been highly uneven, not only in terms of the distribution of economic costs and benefits but also in terms of its effects on the spatial distribution of people. Political economic factors related to the expansion of export-oriented agriculture constrain access to the most fertile lands of the region. This results in a highly unevenly distributed population in which the greatest population densities occur in the highlands—the areas most marginal for agriculture. The growing population in the highlands has few opportunities to earn a living and continues to distribute a diminishing amount of land among more and more people while intensifying agricultural production and expanding into areas more marginal for agriculture. Growing rural poverty also stimulates out-migration from the more densely packed south, thereby decreasing population pressure in highland areas and simultaneously augmenting urban populations

and escalating pressure on heretofore undamaged coastal zones in the south and tropical humid forests in other parts of the country.

Within the south, in urban centers throughout Honduras, and in frontier areas being settled, the mounting evidence of ecological and human decline may portend long-term and immutable threats to human, economic, and environmental sustainability. Moreover the government appears to be rushing into the new privatization scheme for its agricultural land and forests without ensuring that it has the capacity to enforce new regulations and ameliorate social and environmental consequences. Deforestation and other grave environmental abuses in Honduras will not improve unless the basic social structural inequalities in the region are confronted and alleviated.

Deforestation will continue so long as people do not have enough land, jobs, and food. Environmental catastrophe will likely ensue unless the predominant development agenda is transformed to remedy expanding social inequalities as well as environmental ills.

NOTES

1. Elsewhere, Susan Stonich (1989, 1993) has critiqued the dominant paradigms used to explain environmental degradation (including deforestation) in tropical areas of the developing world: neo-Malthusian, neoclassical economic/technological, and dependency. The argument is that although several of these major paradigms identify one or more factors relevant to a comprehensive explanation of social and environmental change, no single model adequately explains poverty and environmental deterioration in areas of the developing world such as southern Honduras. As an alternative, the overall approach here is a more comprehensive framework that integrates political, economic, and human ecological analysis. The political economic analysis examines the interacting roles that social institutions (international, national, regional, and local) play in providing constraints and possibilities that affect human decisions that in turn affect those institutions as well as the natural environment. Human ecological analysis allows the consideration of demographic trends, environmental concerns, and issues related to human health and nutrition. It expands the perspective of political economy to include an examination of the distribution and use of resources and the dynamic contradictions between society and natural resources. A more comprehensive discussion of political ecology appears in Stonich 1993, chapter 1.

2. Melons grown on irrigated land have also been an important nontraditional export promoted in southern Honduras in recent years. For discussions of the social, economic, and environmental effects of the melon industry see Murray 1991 and Stonich et al. 1994.

3. These funds were released to the new Honduran government that took office in January 1990. In July 1991 the Honduran Central Bank reached an agreement with the IMF that paved the way for an influx of American capital—$1.8 billion worth of external finance over a three-year period: U.S.$300 million in 1991, U.S.$70 million in 1992, and U.S.$750 million in 1993 (Honduras/International Monetary Fund [Honduras/IMF] 1991a:5). In August 1991 Honduras requested from Mexico and Venezuela the rescheduling of its U.S.$51.2 million bilateral debt and a new loan of U.S.$120 million (Honduras/IMF 1991b:6).

4. Erosion is estimated to occur at rates as great as 13 tons per hectare per year in the upper Choluteca watershed, and about 168 cubic meters of soil per second are transported in the river at the bridge on the outskirts of the city of Choluteca (Vega 1989).

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Peasants and Global Environmentalism

Akhil Gupta

"South" versus "North"

In contrast to the humanistic pronouncements of "sharing one world," made mostly by leaders and activists from the North, is the view of representatives of poor countries that the environment is a crucial arena where conflict between the haves and have-nots manifests itself. This is a perspective that is likely to increase in importance in the future. As Gus Speth, president of the World Resources Institute, put it after Rio, the United States "has totally missed the point that the axis of world affairs has shifted from East-West to North-South" (*Newsweek*, June 22, 1992, 46). Maurice Strong, the UNCED secretary general, emphasized the same point when he said, "If we fail at Rio, it will be one of the greatest breakdowns ever in international relations, especially concerning North and South" (*India Today*, June 15, 1992, 71).

The general outlines of the argument made by the South are the following: Most of the pollution in the world (CFC emissions, carbon dioxide emissions, toxic wastes, pollution of oceans) and the overwhelming proportion of resource depletion have been caused by rich countries in the North in the process of industrialization. For this use of common resources, the North did not pay anything. Now that poor countries in the South are industrializing, the North wants to put up barriers on the grounds that the commons cannot be allowed to deteriorate any further. As *Newsweek* pithily put it, "This is the global application of the well-known phenomenon that one's willingness to make 'sacrifices' for the environment goes up in proportion to the number of Volvos one already owns" (June 1, 1992, 22). The South wants to get equal access to the commons. Or, put another way, it wants compensation from the North for having used up common resources so that it can industrialize without using the same polluting, wasteful technologies employed by the North in its industrialization. However, the countries of the North are not willing to make such transfers, and because they control the few instruments of international governance that exist, they usually have their way.[1] I will illustrate this viewpoint by analyzing in greater detail some specific issues that came up at the Earth Summit.

The first point of contention at the Earth Summit had to do with its agenda.[2] Thus, greenhouse gases, biodiversity, and the preservation of forests were discussed on the grounds that they constituted global issues requiring global negotiations and treaties, whereas issues such as desertification, soil erosion, drinking water availability, and sanitation were ignored on the grounds that they were "local" issues best left for sovereign nations to deal with (Centre for Science and Environment [CSE] 1992:2; *India Today*, June 15, 1992, 90).[3] Environmental concerns were discussed in isolation from the economic processes in which they were embedded. So, for example, matters relating to protectionism practiced by northern countries or an end to tariff discrimination against goods manufactured in the South were avoided. Dawood Ghaznavi, head of the Worldwide Fund for Nature in Pakistan, said "GATT is crucial to saving the environment. The fact that trade was largely left out of the financing discussions is the most regrettable thing that happened at UNCED" (in Schwarz 1992:61). A major trade-related issue that has very significant implications for the environment is Third World debt. Indeed, it has been argued that the North could achieve more by debt forgiveness than any explicit policy aimed at ecological degradation and resource conservation. Although they have been much admired as creative solutions to tropical deforestation, debt-for-nature swaps end up supporting the current global debt regime rather than seeking to dismantle it. "Only desperately-indebted countries have their debt sufficiently discounted on the world's secondary debt market so that it can be purchased in debt-for-nature swaps. Debt stress, and the implicit threat of terminating the flow of loans and bridging funds, is typically in the background as environmental organizations and development agencies have worked to prompt developing countries to strengthen their environmental conservation policies" (Buttel 1992:20). Environmental organizations and development agencies thus rely on the presence of debt stress to provide leverage for their own interventions.[4]

Perhaps one way of understanding the divergence between North and South at the Earth Summit is to see that of the two themes that the conference was trying to bring together, environment and development, the North focused on the former while ignoring the latter, whereas the South focused on the interrelationship between the two.[5] Third World environmentalists point out that environmental problems in the North arise from different sources than do those in the South (Shanmugaratnam 1989). In rich countries, the chief problems have to do with the control of pollution and the disposal of wastes. In poor countries, by contrast, the chief problems arise from the overexploitation of the natural resource base (CSE 1992:1).[6] This overexploitation is not due to "population pressures" or "poor management," as northern experts would have it, but to economic linkages in which the raw materials from the South serve as essential inputs into goods manufactured, and largely consumed, in the North. Anil Agarwal, for example, points out that "despite the worldwide process of decolonisation, there is today many times more land being used in the developing world to meet the food needs of the Western countries than in the 1940s" (1985:5). In a World Bank paper, Piritta Sorsa acknowledges that "as a transmitter of many externalities, trade may contribute indirectly to environmental damage" (1992:3). He goes on to argue that only 1 percent of yearly destruction of tropical timber can be attributed to international trade, the rest being the result of "land clearance for agriculture, and

the poor's use of wood for fuel" (3). He neglects to ask if the clearing of forestlands or cutting of wood may be related to the use of the best agricultural land to grow crops for export or the use of wood in industrial products also employed for the same purpose. The counterfactual question should be, If the First World's consumption per capita were the same as that of the twenty most densely populated Third World countries, how much destruction of forests would there be?

The potentially more "open" agricultural trade regime that will result from GATT certainly does not bode well for the future of sustainable agriculture in the Third World. Those regions that use mechanisms to force prices of agricultural goods to reflect externalities such as nonrenewability or pollution would find their markets flooded with cheaper commodities from regions that do not adopt such measures (Harold and Runge 1993). The speed with which sustainability is exported to the rich countries of the North is likely to be accelerated, as highly indebted Third World countries set up efforts to increase agricultural exports to the West to meet their interest payments. Because increases in output with methods of industrial agriculture also involve increased outlays for petroleum-dependent inputs such as chemical fertilizers, the balance of payments consequences of agriculture-led export growth are unlikely to be highly favorable for poor countries and may even turn out to be only one bad harvest away from being negative (see also Buttel 1993). On the other hand, sustainable agriculture, presumably conducted with organic inputs, would have the effect of reducing expensive petrochemical inputs and hence reducing foreign debts for poor nation-states, but they would, as a result, make debt-for-nature swaps less attractive for banks, donors, and environmental organizations. It would thus undercut one of the key programs mounted by First World environmental organizations to promote sustainable growth.[7]

Transnational trade is one of the most effective ways to transmit the ecological costs of overconsumption on to others. One way to theorize the transfer of materials processed at enormous environmental costs in the South to the North through "free" trade is to see that such transfers represent a subsidy to northern consumers. A report by the Centre for Science and Environment (1992:2–3) makes this point very clearly: "Developing countries export sustainability while industrialized countries import it at the cost of the former. This discounts the future of the South and passes on the immediate costs of environmental degradation onto the world's poor living on the margins of their environment."[8] This transfer is exacerbated when the terms of trade turn against the raw materials that poor countries export to the North. And this is precisely what happened throughout the 1980s.[9] If the current effort to institute Trade-Related Intellectual Property rights is successful, it will further disadvantage many poor peasants in the Third World vis-à-vis powerful transnational corporations. Farmers, who now save, modify, and sell seeds of high-yielding varieties to one another will be prevented from doing so by the new arrangements. A sense of the importance of farmer-to-farmer transfer of seeds can be gauged from the fact that only approximately 38 percent of the seed requirement of Indian agriculture is sold by formal agencies.[10] Henceforth, this will be the exclusive right of the companies that hold the Plant-Breeders Rights to the seed in question (*New York Times*, May 16, 1989). Patent rights (Intellectual Property Rights) thus become a code to protect the "rights" of

multinationals to corner the surplus from the sale of seed varieties. Anyone who has the resources to alter seeds genetically and then, very important, has the ability to patent such an "invention" obtains the monopoly to market such seeds (Khoshoo 1993; *Economist*, May 30, 1992, 64; June 13, 1992, 93–94).[11] It is for this reason that the leader of the Karnataka farmers announced that their "one-point program" was to "drive out the multinationals" (Sahai 1993a, b; Shiva 1993).

The argument about the South's export of sustainability finds support in the fact that northern countries are willing to promote global environmentalism as long as it doesn't affect their consumption practices. The data here is compelling: "The haves form just 23 per cent of the population, occupy 50 per cent of the land area, account for 60 per cent of the energy consumed and earn 85 per cent of the world's income. … an average American consumes over two tonnes of steel every five years in the form of cars and eats 112 kg of meat, whether beef, lamb or pork, every year. And consumes 7,822 kg of oil equivalent annually. In contrast, an average Indian consumes 50 kg of steel in the form of a cycle and eats only 2 kg of meat annually. And consumes barely 231 kg of oil in the form of energy" (*India Today*, June 15, 1992, 96).[12] If, as a thought experiment, one were to multiply India's per capita consumption figures by four to compensate for its larger population, consumers in the United States would still end up using ten times as much steel and oil as Indians. This is entirely consistent with other studies of consumption (Bidwai 1992:853). That Western styles of consumption were not sustainable was evident a long time ago. In 1908, Gandhi asked, "If it took Britain the exploitation of half the globe to be what it is today, how many globes would India need?" (cited in CSE 1992:4). Southern leaders at Rio insisted that the real issue was overconsumption by the North; predictably, there was almost no acknowledgment of this fact except in Gro Harlem Brundtland's opening statement, in which she said, "We can't tell the Third World, 'The waste-basket is full because we filled it, now you have to help us empty it'" (*Facts on File*, June 18, 1992, 442).[13]

These positions were prominently displayed in the debates over the global warming treaty, which called on all industrial nations to return to their 1990 levels of emissions of hothouse gases. Developing countries would be permitted a ten-year grace period before restrictions were imposed on them. The twelve nations of the EC had made an earlier pledge to reduce their emissions to 1990 levels by the year 2000, and they repeated that pledge at the summit. Germany, which is responsible for 3.2 percent of global carbon emissions, unilaterally agreed to cut them by 25 percent by the year 2005. In the face of stiff U.S. opposition, however, the treaty was signed without specific deadlines. Together, the United States and the former Soviet Union account for over half the carbon dioxide emissions in the world, and as a group, the North is responsible for 90 percent of the carbon dioxide that has accumulated in the earth's atmosphere so far (*New York Times*, May 2, 1989; Tokar 1989; Bidwai 1992:854). Yet a plan to impose a carbon tax in industrialized nations was foiled owing to heavy lobbying by oil-producing countries.

Given the inbuilt inequalities in the treaty that favored industrial countries, the U.S. reluctance to sign was surprising.[14] Praful Bidwai offers the following example: "If U.S. per capita annual emissions (5.2 tons) were to be frozen and India's (0.22 tons) were to grow at recent rates, India would not reach one ton a year until 2024—a

level surpassed by the United States well before 1900" (1992:854). Although industrial countries are required under the treaty to assist developing nations financially and technologically to control their emissions of greenhouse gases, the financial commitments do not approach the true cost of atmospheric exhaustion. "If Northern emissions could be traded with the South at $15 per ton of carbon equivalent and damages were to be paid at $25 per ton, the top fifteen polluters would have to pay $110 billion to the South; the United States alone would have to pay $45 billion a year" (Bidwai 1992:854). When the UNCED secretariat pressed the industrialized countries to contribute $125 billion toward resolving *all* major environmental problems faced by the South (an effort that they estimate will cost $625 billion annually), they met with little success. Members of the EC and other industrial countries agreed to increase their aid levels to 0.7 percent of their GNP "as soon as possible" (but with no date specified). The United States refused to agree to the aid target that it, along with other industrial nations, had pledged to meet during the Stockholm Conference in 1972!

Many people in the First World, policymakers and environmentalists alike, held up the Montreal Protocol on Substances That Deplete the Ozone Layer (1987) as an example to be emulated in the design of international environmental treaties (Babbitt 1992:36; French 1992:12–14; *Economist*, June 13, 1992, 39). The Montreal Protocol had delayed deadlines for developing countries, a provision to transfer resources, and punitive trade measures for nonimplementation. The view from the South, however, saw the ozone layer treaty as a disastrous pact that would permanently institutionalize global inequalities. Bidwai offers this opinion: "Since no responsibility is attached to different countries for their varying contributions to the CFC burden, no rights and obligations follow. So the South, with its current emission of 12 percent of CFCs, is asked to make the same commitment, albeit over a longer period of time, as the North, which produces 88 percent of the total. The underlying assumption is that it would be a disaster if every Chinese or Indian (not American or Japanese) had a refrigerator, but that it is not necessary for the rest of the world to find substitutes for CFCs" (1992:854). What has gone unnoticed about the ozone layer agreement is that it was enthusiastically supported by the handful of multinational corporations who produce CFCs. The reason is that they are also the only companies that manufacture CFC substitutes, and "a world ban on CFCs was obviously an ideal way to lock up the largest possible market for substitutes" (Cairncross 1992:18). Countries in the North were also far more concerned about the consequences of the depletion of the ozone layer, as it had immediate effects on the health of their populations.

The struggles between North and South were sharpest, however, over the proposed forest convention, which was scaled back to a nonbinding statement of forest conservation principles in the teeth of stiff opposition from such countries as Malaysia, India, and Indonesia (*Far Eastern Economic Review*, June 25, 1992, 62; *Facts on File*, June 18, 1992, 442; Lakshman 1992). Northern countries, led by the United States, were very keen to push through a forest convention. Tropical forests in particular are excellent "sinks" that absorb carbon dioxide and thereby minimize or reverse global warming. They are also the sites where most of the world's genetic diversity is preserved.[15] The northern countries thus felt that they would benefit on two different fronts with one policy. Countries such as Malaysia and India argued that forests were a sovereign

resource.[16] Malaysian prime minister Mahathir bin Mohamed said that a forest convention made sense only after a worthwhile agreement on industrial emissions was reached. Like other developing countries, Malaysia felt that the United States had no justification for pushing for a forest convention while failing to agree to a timetable for halting global warming.[17] Mahathir bin Mohamed argued that timber sales were crucial to the economic development of his country. Once again, the deteriorating terms of trade of primary goods entered the picture in a central way. The Malaysian prime minister suggested that instead of poor countries' having to shoulder the responsibility to provide carbon sinks for the entire world, an aggressive worldwide program of *re*forestation be conducted in which northern countries would be responsible for shutting down their inefficient farms and their polluting industries and foresting the land on which they stood.[18]

So far, I have attempted to draw a contrast between "one world" versions of global environmentalism and "North-South conflict" views of the same phenomenon. Both these perspectives underplay the significant differences between states, environmental groups, and subaltern groups within the North and the South, suggesting a degree of homogeneity that does not in fact exist. In the next section, I argue that despite their sharply opposed viewpoints, "one world" and "North versus South" positions share a modernist discursive space shaped by common ideas about territoriality, sovereignty, and the nation-state.[19] What are the commitments entailed by such a view? Does this perspective obscure emergent processes of global regulation and control? Specifically, are there *postcolonial* forms of global discipline and global regulation that are elided by emphasis on national sovereignty? It is to these questions that I now turn.

Rethinking Environmentalism: Governmentality on a World Scale

Global environmental problems have brought about an interesting convergence between otherwise radically distinct political and theoretical positions. People who hold different perspectives on environmental issues all agree that they somehow bring into question the premise of national sovereignty on which the existing order of nation-states is based (Wallerstein 1991b:140; Young 1982, 1989).[20] What continues to differentiate people along lines of "one world" or "North-South conflict" is their understanding of exactly how national sovereignty has become problematic, what is to be done to deal with this new situation, and how one goes about theorizing the emerging world context (Walker and Mendlovitz 1990b:1). In this section I argue that one way to understand global environmental accords is to see them as part of a larger process that is weakening the intimate links between "nation" and "state." I see this as a fundamentally "postcolonial" moment in that it initiates a break with a spatial order of sovereign nation-states that was forged in the anvil of colonialism and fired in the furnace of national liberation.

Typical of nongovernmental North views is the one expressed by French.

National sovereignty—the power of a country to control events within its territory—has lost much of its meaning in today's world, where borders are routinely breached by

pollution, international trade, financial flows, and refugees. Increasingly, they may be eroded by such forces as climatic warming, migrations, and the depletion of the earth's ozone shield. Because all of these forces can affect environmental trends, international treaties and institutions are proving ever more critical to addressing ecological threats. Nations are in effect ceding portions of their sovereignty to the international community, and beginning to create a new system of international environmental governance as a means of solving otherwise-unmanageable problems. (1992:6)

Similarly, in the wake of the pessimism expressed by many at the failure of the Earth Summit to approve binding treaties, there were those who pointed out that the real gains of Rio should not be overlooked. One of the benefits of the Earth Summit was that "for the first time in history, nations vowed to take into account global environmental concerns when making *internal* economic decisions" (*Newsweek*, June 22, 1992, 46). Jessica Tuchman Mathews, vice president of the World Resources Institute, is quoted as saying, "[The global warming treaty] has the potential of forcing governments to change domestic policies to a greater degree than any international agreement I can think of" (*Newsweek*, June 15, 1992, 33). Maurice Strong brought together the ideology of markets with concerns about security in speaking of a "new global compact in which the industrialized nations understand that they cannot secure their future without a partnership with developing nations" (*Far Eastern Economic Review*, June 25, 1992, 61).

The view from the South also recognizes that discourses of environmental degradation pose a distinctive new kind of threat to national sovereignty because of their stress on northern control of remedial measures.[21] In southern interpretations, the emphasis has so far been either on northern dominance, sometimes glossed as "ecological imperialism," or on the necessity of seeking broader coalitions. In the former case, national sovereignty is at peril because control over national resources (forests, and flora and fauna embodying biological diversity) is threatened by powerful northern countries in the name of preserving the "world's heritage" (Chengappa 1992). This is clearly the view expressed by Malaysia's Mahathir bin Mohamed.[22] In the latter case, national sovereignty is rendered ambivalent because the only way to defend it is to merge one's own national interests with some other nation's. Traditional enemies, China and India, banded together, and the Group of 77 united in the face of strenuous northern attempts to split them up (*India Today*, June 15, 1992, 70).

Another way to see the growing recognition of the crisis of sovereignty is to look at opinions about the role of *international* organizations in dealing with environmental issues (Keohane and Ostrom 1995). The present system of international governance, organized largely in the immediate aftermath of the Second World War, is considered to be ill-equipped to deal with global environmental questions. Whereas the Brundtland Commission identifies the narrow mandates of existing institutions as the source of their inability to deal with global environmental problems, others believe that a more radical overhaul of the *system* of international institutions is necessary.[23] There is thus a recognition that environmental issues are raising questions about national sovereignty and *international* governance, about national order and the order of nations. But to understand precisely what this challenge means theoretically, I will first briefly trace the historical relations between sovereignty, territoriality, and the nation-state.

However odd it may appear from the perspective of the present, the notion that systems of rule should be, or need be, territorial is not at all self-evident.[24] It is a peculiarity of the particular history of modern Europe that a system of rule came to be institutionalized that had at its basis states that were *territorial*; that were, moreover, territorially *fixed*; and that entailed the *mutual exclusion* of others from the territory (Agnew and Corbridge 1995:79). In medieval Europe or precolonial India, for example, territorial exclusion was not an operative principle of political power.[25] "The distinctive feature of the modern—homonomous—variant of structuring territorial space is the familiar world of *territorially disjoint, mutually exclusive, functionally similar*, sovereign states" (Ruggie 1993:151, emphasis added).[26] A strong centralized administrative state is not found in Europe until the end of the fifteenth century (Foucault 1991:103), and it is another two centuries before a *system* of states comes into effect (Young 1988:29). Charles Tilly called the sixteenth century "a time of significantly rising stateness" and characterized the later seventeenth century as constituting "a frenzy of state-making" (1975a:34).[27] In other words, a long period of conflict over the *nature* of political units was followed by conflict over the *boundaries* of those units (Ruggie 1993; Tilly 1975a:28). Yet by the beginning of the eighteenth century, the practice of the mutual acknowledgment of sovereignty that it termed the "state system" was already in place.[28] That this was a highly contingent outcome was underlined by Tilly when he wrote: "The Europe of 1500 included some five hundred more or less independent political units, the Europe of 1900 about twenty-five. The German state did not exist in 1500, or even 1800. Comparing the histories of France, Germany, Spain, Belgium, and England (or, for that matter, any other set of West European countries) for illumination on the processes of state-making weights the whole inquiry toward a certain kind of outcome which was, in fact, quite rare" (1975a:15).[29] State sovereignty, which is today often elided with national sovereignty, actually emerges in a period historically prior to the consolidation of the nation (Wallerstein 1991b:143). That this curiously hyphenated entity, the nation-state, does not evoke constant surprise is a testimony to its complete ideological hegemony. Scholarly work has tended to underestimate seriously the importance of that hyphen, which simultaneously erases and naturalizes what is surely an incidental coupling (Kaviraj 1994; Nandy 1992). Tilly emphasized this when he said, "In Europe … [nation building] generally occurred after the formation of strong states, and by no means as a direct or automatic consequence of state-building alone." He summarized the contributions to a volume on state building in Europe by emphasizing that the authors "insist on the analytic separation of state-building from nation-building, and consider *the nation-state only one of several possible outcomes of state-building*" (1975a: 70–71; emphasis added).

Scholars of nationalism ask what holds such an imagined community together; what the mechanisms are that produce and reproduce the structure of feeling that is termed "nationalism"; what its exclusions and silences are; how it emerges; and where it is likely to lead. Scholars of states inquire into the circumstances that led to the centralized system of administrative rule that is called the state system; what conditions ensure its reproduction; the situations in which states are transformed, come into existence, die, or fall; what enables them to get things done, to defend their borders, and to secure their existence. When the concept of *national sovereignty* came to be

conjoined to the territorial basis of statehood, then the ideology of the modern order of nation-states, as it exists today, was firmly established (Ruggie 1993: 163; Walker and Mendlovitz 1990a:6).[30] Just as states need the interstate system to establish territorially based authority, so do nations need the international system to engender, regulate, and normalize the feelings that are dubbed "nationalism." In fact, neither statehood nor nationalism is possible or intelligible without the interstate and international systems.[31] What has to be understood about the nation-state is that it fuses these powerful forces in one entity. Not enough attention has been paid in the scholarly literature so far to the implications of this fusion, both for the study of nationalism and "the state" and, equally importantly, for the study of internationalism and the interstate system.[32]

Once the problem is laid out in this manner, it becomes clearer why the idea of sovereignty is so paradoxical. The claim of sovereignty is one that attempts to stabilize and fix territorial boundaries, specify identities, and establish unambiguous control over goods and people (Onuf 1991; Shapiro 1991: 448, 473; Walker 1993:161).[33] But insofar as the sovereignty of nation-states depends on the recognition of *other* nation-states, of other units that are different in their culture, history, and even "temperament" but alike in their constitutive modality, then the pretense to self-sufficiency is revealed for what it is (Malkki 1994). In other words, sovereignty is a *relation* that, to be exercised, must "misrecognize" itself as a self-sufficient identity. Starting from the premise of state sovereignty, therefore, already structures the analysis of "interdependence" or "world politics" in such a manner that alternative forms of alliance, community, spatialization, or identity are suppressed or erased (Agnew and Corbridge 1995; Shapiro 1994; Walker 1993; Walker and Mendlovitz 1990b).

The paradoxical nature of sovereignty as absolute individuation first became visible with problems of diplomacy. The question was how to recognize the sovereignty of some other state *within* your own territory through the person of the ambassador and the ambassador's staff and their offices and residences. The solution was to carve out a particular space (the embassy) that was recognized as "extraterritorial" in that the laws of some other nation-state operated on that particular territory.[34] Not just diplomats and common property resources challenge the ideology of sovereignty: flows of all kinds across the borders of territorial nation-states, most notably trade but also images, finances, and people, call the construction of stable identities into question.[35] Ruggie suggests the notion of the "unbundling" of territory as a way to come to grips with the means employed by nation-states to "attenuate the paradox of absolute individuation" (1993:165).[36]

Another way to theorize this growing phenomenon of the "unbundling" of territory is to think about its consequences for the hyphen between nation and state (Appadurai 1993). What I would like to suggest is that there is a growing tension between nation and state so that the particular enclosure that was conjured by their historically fortuitous conjunction may slowly be falling apart. The clearing does not hold in the hyperspace of late capitalism. The kinds of activities and meanings that were ideally brought together by nation-states—the regulation of industries, goods, and people; the control and surveillance of populations; the exercise of the monopoly on violence within the territory; the provision of "security" with respect to other nation-states

(Dalby 1992); the employment of laws; the feeling of belonging to "a people"; the belief in particular historical narratives of identity and difference—may be untangling (Comaroff forthcoming).[37] It is very likely that they will reconstitute themselves into different bundles. But it is highly *unlikely* that the reconstituted entities will simply be reproductions of nation-states, writ large or small. As Étienne Balibar has said of the European Community, "The state today in Europe is *neither national nor supranational*, and this ambiguity does not slacken but only grows deeper over time" (1991:16).[38]

This focus on the "unbundling" of territorially based sovereign nation-states may help us see that much of the discussion on whether nation-states are declining or increasing in importance may be missing the point. For one can often point to persuasive evidence that leads to *both* conclusions for the *same* cases. Rather than be cursed like the equivocator "that could swear in both the scales against either scale,"[39] I wish to argue that the "postcolonial" be employed to signify that the hyphen between nation and state be written "under erasure." Arjun Appadurai uses the term "postnational," arguing that it has three possible implications: that other forms of allegiance and identity are replacing the nation-state; that alternative forms of organizing the flow of resources, images, and ideas are contesting the nation-state or constituting peaceful alternatives to it; and that national identities are taking hold that have no foothold or basis in territorial states (1993:421).[40] To suggest that the particular historical conjuncture that brought "nation" and "state" together into a stable form of spatial organization may be coming to an end is not to argue that forms of "nation-ness" or forms of "state-ness" are in danger of disappearing altogether.[41] New, more menacing, racially exclusionary forms of national identity are emerging in Europe and the United States, for example, and statelike functions are being performed by organizations such as the European Union and transnational corporations. One way to understand the enthusiasm with which "big" government has been attacked in the North is to see that the Fordist project of regulating the national market through government intervention is no longer viable. Fordist mass production proved to be an unusually efficient engine of growth, particularly in the United States since the Second World War (Aglietta 1979; Brenner and Glick 1991; Davis 1984). However, late-capitalist forms of capital accumulation have been straining against the fetters of a national market, and so the national state now appears to be an overbearing presence.[42] National states are by no means obsolete, but their statelike functions are being increasingly "privatized" except insofar as they represent direct subsidies to transnational corporations. What is one to make of this retreat of "state-ness" in the very heart of the capitalist West? And how is the selective rollback of the functions of the state to be related to the virulence of an exclusionary, racially charged nationalism? Are these twin movements connected in any way to postcoloniality? What I wish to suggest is that if postcoloniality is the condition that registers the exhaustion of the promise of the modern nation in the former colonies, its other face is the superannuation of the Fordist nation in "the West." The two movements, one toward poststate forms of capitalist organization in "the West" and the other toward postcoloniality in the Third World, come to be linked at this historical juncture by new modalities of global discipline and regulation.[43]

Instead of the decline of the nation-state, I prefer to talk about the tension between "nation" and "state," arguing that a particular relationship that coalesced in the formation of nation-states may be unraveling. Of course, in many parts of the world, particularly those whose borders were arbitrarily drawn by departing colonial rulers, that relationship between nation and state was never a convincing fiction.[44] Another way to theorize the growing crisis of the hyphen is to shift our attention to a process that Foucault (1991) has termed "governmentality." By government rationality or governmentality, Foucault refers to that ensemble of institutions, procedures, and tactics that allow the exercise of a certain kind of power whose object is population in the sense that it seeks to regulate the relations between people and things (Gordon 1991). In Europe, the problem of government expanded in the sixteenth century in the face of opposing tendencies to state centralization and religious dissidence. Thus, the government of the self, the government of souls and lives, the government of children, the government of the family, and the government of the state by the prince all become important questions in that period: "how to govern oneself, how to be governed, how to govern others, by whom the people will accept being governed, how to become the best possible governor" (Foucault 1991:87). The model of government was provided by economy, the art of managing a household wisely for the common welfare of its members. The problem was to extend this model of the household to the government of the state, to exercise over people and things within a particular territory the kind of surveillance and control that the head of the family exercised over his patrimony—his family and his goods. This became possible only with the rise of statistics (with its etymological root as "the science of the state"), which provided the technology to envision the "economy" and "the population" as concrete and palpable realities through tabular representation. By the middle of the eighteenth century, the craft of governing well thus became the art of managing the economy and the population for the common welfare of all.[45] The sole purpose of rule was no longer just the defense and expansion of the sovereign's wealth and territory; rather, it became the provision of security more generally.[46] This technique of governmentality was instituted both inside and outside the state. It was a "very specific albeit complex form of power, which has as its target population, as its principal form of knowledge political economy, and as its essential means apparatuses of security" (Foucault 1991:102), a form of rule that Foucault suggests continues to operate in the present.

What I am suggesting in this chapter is that we may be witnessing the birth of a new regime of discipline in which governmentality is unhitched from the nation-state to be instituted anew on a global scale.[47] In this project, global environmentalism comes together with other global accords and treaties, and the institutions through which these "compacts" are monitored and enforced, to regulate the relationship between people and things on a global (not simply international) scale. The Earth Summit, GATT, and other international treaties are attempting to institutionalize a new form of governance, this time not within the territorially defined boundaries of the nation-state but across an "unbundled" space for which there is not as yet a name, a brave new world order (Gill 1991).[48] These shifts in forms of governance are integrally related to the reorganization of capitalism in the last quarter of this century (Mandel 1975; Harvey 1989). Just as the nation-state was integral to Fordist manufacture by

multinational corporations, which had the backing of powerful imperialist states, so is the tension between nation and state related to the industrial dominance of *transnational* corporations in post-Fordist capitalism, which are themselves ambivalently positioned in regards to their nationality. But these new models of governmentality are not going unchallenged by groups that are likely to be adversely affected by them. I turn now to an analysis of the actions of peasant groups in India that have organized a series of successful protests against global treaties.

Peasant Protests

No one can predict how emerging modes of governmentality will affect the everyday lives and practices of peasants in different parts of the world. Vigorous reactions to the GATT were recorded during the year preceding its formal signing on April 15, 1994, however. In this section I analyze peasant protests in India, reflecting on the interpretations implicit in their actions.

The farmers' rally had its origin in another act, the daring "raid" of December 29, 1992, in which members of the Karnataka Farmers Association ransacked the Bangalore corporate offices of Cargill Seeds India Private Limited, an Indian subsidiary of the giant U.S. grain-trading multinational. Seventy-five farmers climbed the four flights of stairs to the Cargill office, burst through the door, announced that they did not intend to harm the dozen or so employees but were there as a protest. The farmers then proceeded to smash windows, break open filing cabinets, and throw papers and financial records through the window to the crowd of four hundred waiting below. Once the stack of papers grew tall, Nanjundaswamy handed over a box of matches to a farmer who lit the flame, bringing all traffic on the road to a halt. "Bon fire," Nanjundaswamy proclaimed, adding, by way of explanation: "From the French origin. Good fire." The farmers gathered in a ring around the fire and shouted "Quit India" in Kannada (Tolan 1994:18).

This action drew a formal protest from the U.S. government and is credited with "opening the Dunkel debate to the public" (*Frontline*, January 14, 1994, 42). Professor Nanjundaswamy, the leader of the Karnataka Farmers, was unrepentant. Using the same logic displayed by Union Carbide in rejecting responsibility for the actions of its Indian subsidiary in the Bhopal disaster but inverting its ends, Nanjundaswamy claimed that because Cargill India is registered under the Indian Companies Act, "what happened at Bangalore was between Indian farmers and an Indian company. There is no room for diplomatic interfering. America's interference exposes their ulterior motives. The Indian government should not [have] tolerated this, let alone apologized." He went on to add that he had received congratulatory telegrams from all over the country after the attack (*Times of India*, January 11, 1993). This raid was followed by another attack on the Cargill factory in Bellary. In protest against the patents taken out on the biopesticide qualities of the neem seed, the Karnataka Farmers threatened to destroy the factory owned by the Indian partners of the American multinational W. R. Grace Company (*Deccan Herald*, November 23, 1993). Eventually, they did not go ahead with their plan because of the presence of a hydrogen plant next to the targeted factory.

In Nanjundaswamy's discourse, the Farmers Association was carrying on a struggle against colonialism that had first been launched by the nationalist movement. He proclaimed the farmers' intentions as being "to banish all multinational seed companies which are here to ransack our country." He explicitly referred to the farmers' actions as initiating the "second Quit India Movement against imperialists" and reiterated their commitment to Gandhian socialism, "which has been forgotten by all political parties" (*Times of India*, January 11, 1993). Very similar themes were voiced by other leaders at a giant rally of half a million farmers that took place in Bangalore on October 3, 1993. Mahendra Singh Tikait, the leader of the primarily north Indian farmers organization, the BKU, warned those present to be prepared for a second round in the freedom struggle. He compared the multinational seed and pesticide firms with the East India Company, which had looted the country of its wealth. "We should not permit the recurrence of such an act. The country is still to attain prosperity" (*Hindu*, October 4, 1993, 11). Similarly, Sesha Reddy, one of the most prominent of the Karnataka activists, said: "We call Cargill the West India Company. We don't want a West India Company to once again dominate our economy, our freedom, our politics. We are prepared to die for this." Graffiti on city walls declared, "Reject Dunkel, Reject Imperialism" (Tolan 1994). Tikait, even more than Nanjundaswamy, reproduced a nationalist discourse in which prosperity and modernity constitute the telos of national liberation. Both leaders used development discourses, premised on teleologies of the nation, that had been hegemonic internationally until the eighties to organize against the contemporary paradigm of "open" economies touted by the international aid system.

The nationalist rhetoric of such peasant leaders as Tikait and Nanjundaswamy might appear to be anachronistic in 1993, especially given the disappointments faced by the large majority of rural Indians in almost half a century of independence. But the peasant leaders' rhetoric is mixed with a shrewd recognition of the current global historical conjuncture and of the importance of forging coalitions with similar groups in other parts of the world. Like those movements of indigenous peoples that have formed, on the basis of an indigenous identity, transnational coalitions that are simultaneously above and below the nation-state, peasant leaders worked actively to make connections with other groups across the world. Thus, of the resolutions adopted at the meeting, one proclaimed that "plant wealth, seed wealth, and intellectual property were the property of the *farmers of the world* and called upon all countries to launch a direct struggle to protect the collective rights [of farmers] and prevent them from being robbed by multinational companies" (*Hindu*, October 4, 1993, 11; emphasis added). An international research center to develop intellectual property rights on behalf of farmers was initiated and a pledge made to continue the free exchange of seeds among farmers of the Third World. The international institute for sustainable agriculture was formally inaugurated on May 30, 1995, as a joint project of the KRRS and the Third World Network, a development and environmental organization based in Malaysia.[49] Apart from the promotion of organic farming techniques, the aims of the institute include helping farmers store traditional varieties of cultivars in community seed banks and revitalization of those cultivars to preserve genetic diversity. Farmers brought two hundred varieties of various crops with them to start the institute's seed

banks. Explaining the need for the institute, Nanjundaswamy said that farmers had been incurring mounting debts because of input-intensive modes of cultivation, that they had become dependent on a few varieties of cultivars promoted by large seed companies, and that the soil had been made infertile by large doses of chemical fertilizers. Therefore, it was necessary to turn to productive, sustainable, organic farming (Khor 1995).[50]

Nanjundaswamy featured prominently in an anti-Dunkel protest meeting of farmers, ecologists, and consumer groups from around the world in Geneva on December 4, 1993, while the final GATT negotiations were taking place. Contrary to positions attributed to him earlier, he maintained, "Our stand is that India should remain a member of GATT, but should have demanded drastic amendments in the agreement" (*Frontline*, January 14, 1994, 42). In what follows, I will briefly pursue the interesting contradictions between the explicit emphasis on national sovereignty and self-determination and the populist appeal to "farmers of the world" and to other transnational, intermestic (*inter*national/do*mestic*) coalitions that put sovereignty into question.[51]

These tensions were harder to find in the statements of various peasants at the March rally, which, in conscious reference to the Independence Movement, was called the "seed protest" (*beej satyagraha*).[52] As one farmer put it, "We are aware that these foreign proposals are an attempt to deny the best seeds to us and put us at a disadvantage when compared to farmers of richer nations. If they are accepted, the multinational companies will start determining *our domestic* agriculture policies. We are also protesting against other anti-farmer steps taken by the government in the past" (*Times of India*, March 4, 1993; emphasis added). In virtually the same sentence, this farmer articulated both the kind of nationalist position historically espoused by the government in India and a critique of the same government for emphasizing the industrial, as opposed to the agricultural, sector in its pursuit of modernity and self-reliance. Deewan Chand, a small farmer from Muzaffarnagar, UP, voiced a more unambiguous nationalist position: "Our leaders have said that the foreign paper [Dunkel Draft] is an evil design to sell Mother India to foreigners. For a *kisan* [farmer] the life support are his land, seed and plough. If the Rao Government sells these to foreigners what will happen to the national pride?" (*Hindustan Times*, March 4, 1993, 5). Another farmer, from the prime minister's electoral constituency, expressed incomprehension at the changing objectives of the government. Assuming that the long-held nationalist goal of self-reliance was a worthwhile one, Sesha Reddy pointed to the crisis of food production that had plagued the country in the second half of the sixties: "But not today. We are now self-sufficient in crop production. So why this sell-out to MNCs [multinational corporations]?" (*Hindustan Times*, March 4, 1993, 5).

It would be misleading to portray the massive protests *against* the Dunkel proposals as if all peasants were unanimously behind them. A newspaper editorialized that "those opposed to the Dunkel proposals are the nation's traditional farmers, predominantly small and medium peasants, whereas those who support Dunkel are from those areas where farming is advanced and has assumed the characteristics of a profit-making business" (*Navbharat Times*, March 4, 1993; my translation). Despite its indubitable political appeal, such a dichotomy is not defensible. The great majority of the supporters of the vociferously anti-Dunkel BKU were relatively well-to-do landowning

farmers, with large marketed surpluses, who belong to the prosperous agricultural castes that have been the chief beneficiaries of the government's green revolution policies. Their demands and agitations largely reflect this orientation, calling for loan write-offs, increasing the subsidy for fertilizer, the nonpayment of electric dues, increasing support prices, and so forth.

An analogous class of farmers forms the backbone of the Maharashtra-based Shetkari Sangathana (Farmers Union), which supported the Dunkel Draft. Sharad Joshi, the leader and chief ideologist of the Shetkari Sangathana, declared: "What's wrong with Dunkel? I prefer to pay royalty for good quality seeds than pick up bad subsidised ones" (*India Today*, North American edition, January 15, 1994, 19). The pro-Dunkel group also held a farmers rally in New Delhi on March 31, 1993. Explaining the significance of the demonstration, Joshi stated: "We fully support the Dunkel proposals and a totally free economy. We shall seek an alliance with other forces which stand for a free economy. This will be a producers versus parasites demonstration" (*Hindustan Times*, February 17, 1993). Joshi pronounced the end of the first republic in which the state controlled the economy, and he issued a call for the second republic, with no government control on exports, imports, or the rest of the economy (*Hindustan Times*, February 17, 1993).[53] This was in keeping with his belief that if government restrictions on them were lifted, farmers in India could profitably sell on the world market without subsidies. The organizations present at the meeting presented a five-point charter of demands to the government that included calls for stopping the dumping of agricultural produce from abroad on the Indian market (*Times of India*, April 1, 1993).

The Shetkari Sangathana's position underlines the fact that the class implications of the new modes of governmentality are far from transparent. There are splits even within the politically powerful class of relatively well-to-do farmers with marketable surpluses, and the forces allied against international treaties regulating biodiversity yield no simple mapping in terms of class positions, geographical contiguities, or crop regimes.[54] If the argument advanced in this chapter is correct, the "unbundled" space in which these forms of governance are exercised creates its own possibilities for opposition to coalesce. Just as international and interstate regimes of control and discipline were instituted through the nation-state, the new forms of governmentality operate through this postcolonial space created out of the chasm where the hyphen once stood between "nation" and "state." And just as older modes of resistance coalesced around the politics of the nation-state, employing the rhetoric of nationalism and development, so too will new modes of resistance find their tactics in this "unbundled" space of global discipline (see Walker and Mendlovitz 1990a:10).

N O T E S

1. Speaking about the Rio declaration, *Newsweek* says "the declaration evolved into a lengthy charter spelling out the 'rights' of poor countries to develop in responsible ways. This, of course, is one of the things Darman warned Bush about: it's ecospeak for 'foreign aid'" (June 1, 1992, 22).

2. See especially Shiva 1992.

3. A World Health Organization (WHO) report on global environmental damage points out that safe drinking water and sanitation would have prevented a large proportion of the 3.2 million child deaths that occurred last year from diarrheal disease alone (*Newsweek*, June 1, 1992, 33).

4. Buttel (1992:20) goes on to say, "Some (e.g., Martinez-Alier), in fact, have devoted considerable attention to the fact that the 'North Atlantic ecological establishment' coexists so comfortably within the structural adjustment *Weltanschauung* of the official development community, which exists as much to ensure Third World debt repayment and to patch up the anarchic international monetary order as it does to achieve Third World development."

5. The relationship between particular strategies of development and the environment has been demonstrated in the case of the green revolution.

6. It was precisely the overexploitation of land and water resources that worried farmers in Alipur.

7. It is not just sustainability that is being exported from the Third World. The *New York Times*, in a report entitled "3d-World Funds: Wrong-Way Flow," says "the world's poorest and most indebted countries are beginning to get less in combined aid each year from the World Bank and the International Monetary Fund than they are paying in interest and principal … to the two organizations" (February 11, 1988).

8. See also Kothari and Kothari 1993.

9. "In 1985, the terms of trade of sub-Saharan countries (except oil-exporting countries) were 10 percent below 1970 levels" (Brundtland 1987:3–5). The same process was observed in Latin America: "In 1981, for instance, it took one Latin American country 9.8 times as much beef to buy a barrel of oil as it did in 1961" (A. Agarwal 1985:5). An estimate of the amount of money transferred from economies in the South to the North through debt payments and deteriorating raw materials prices (but not including the costs of consuming common environmental goods) is offered by Martin Khor of the Third World Network. He estimates the value of annual transfers from South to North to be in the range of $200 billion (Hertsgaard 1992:13).

10. In other words, more than 60 percent of the seed used by farmers is obtained from other farmers (Sahai 1993a).

11. The market for seeds in India has been estimated to be worth $235 million for 600,000 tons a year (*Times of India*, December 13, 1993).

12. See also Bandyopadhyay and Shiva 1988.

13. As the CSE statement puts it, "The billion dollar question is: are the rich prepared to pay the real costs of what they consume?" (CSE 1992:3).

14. The reason was the fear that reduction of carbon emissions would entail economic costs. As one U.S. negotiator at UNCED put it, "The United States' standard of living is not up for negotiation" (Hertsgaard 1992:13).

15. Tropical forests, which cover barely 7 percent of the world's land surface, harbor half the species of the world's flora and fauna. A fifteen-acre patch of rain forest in Brunei alone was found to have seven hundred species of trees, as many as in *all* North America (*India Today*, June 15, 1992, 82–84).

16. India's environment minister Kamal Nath argued: "How we deal with our forests is our business. This so-called globalising sinks idea stinks" (*India Today*, June 15, 1992, 87).

17. As Malaysian minister for primary industries Lim Keng Yaik put it: "The U.S. is saying: you lock up your carbon sink, and I am going to do nothing. [It] wants poor countries to sacrifice [revenues from selling wood] in order to maintain the consuming lifestyle of the rich" (*Far Eastern Economic Review*, June 25, 1992, 62). Representatives of the South point to the poor

record of the North in conserving its forests: "Since Europeans first arrived in the New World, all but 5 percent of the virgin forests have been cut down" (*Newsweek*, June 1, 1992, 30).

18. The other side of this picture is provided by José Lutzenberger, former Brazilian minister for environment, who says "the Malaysian minister of the environment is reputedly also one of the worst loggers in that country" (1992:56). In spite of the justifiable criticisms that the Malaysian prime minister makes here, I should not be taken to endorse his record of protecting Malaysia's rain forests, which is reportedly abysmal. However much Mahathir's positions made sense as an advocate for the South, they were interpreted by the inhabitants of Malaysia's rain forests as yet another aggressive move by the national state against their existence.

19. In the section titled "Peasant Protests" below, I consider the implications of changes in this modernist space for differentiation among peasant groups in the South, as well as for the formation of transnational coalitions between groups in the North and the South.

20. See, for example, Keck, who argues, "Such conflicts may raise issues that go well beyond a narrow vision of environmental problems, in questioning states' abilities to know and preside over the public good" (1994:91). Similarly, Walker and Mendlovitz (1990a:1) contend that "in view of … a new awareness of the fragility of the planetary ecology, the organization of political life within a fragmented system of states appears to be increasingly inconsistent with emerging realities" (see also Agnew and Corbridge 1995:95). Contrarily, Krasner argues that the existing order was never a real condition for most Third World states. Despite this, he adds that the Westphalian state has become a reference point or convention that is "useful in some circumstances but not others" (1995:150). I think it is fair to say that the *premise* of national sovereignty has constituted a founding ideology for the global order of nation-states in which most Third World nation-states came into existence.

21. This led the *Economist* to complain, in an article entitled "Root of Evil at Rio": "After all the idealism, the Earth summit in Rio de Janeiro has turned out to be mainly about money and sovereignty" (June 13, 1992, 12).

22. The reporting in the South reflected this sense of defiance to northern domination. For example, an *India Today* report states, "The only time the South showed some grit and India leadership was when the North tried to push for a convention on saving forests. … [T]he South stood firm on the issue as they feared that such a convention would infringe on national sovereignty" (June 30, 1992, 31). Similarly, the *Far Eastern Economic Review* noted: "Malaysia's staunch refusal to bow to US pressure for a stronger statement on deforestation prompted one US delegate to describe the country as the 'bad boy' of the conference. 'So be it,' Razali [Malaysia's ambassador to the UN] says. 'Someone has to carry the can. We don't want to be *pushed aside and be bullied* like we have been for the past 45 years'" (June 25, 1992, 61; emphasis added).

23. French, for example, argues that "international laws and institutions have traditionally functioned as compacts between nations; but if they are to solve the problems of a rapidly deteriorating biosphere, they must also evolve into compacts *between people*" (1992:48; emphasis added).

24. The ideas in this paragraph owe a great deal to Ruggie 1993.

25. See Walker 1993:129 on the relationship between post-Renaissance ideas of state sovereignty and notions of sharply demarcated space.

26. Krasner (1995) identifies the distinctive features of the Westphalian state as being territoriality and autonomy.

27. Tilly traced the emergence of the familiar state system by contrasting it with possibilities that might have been: "In the thirteenth century, then, five outcomes may still have been open: (1) the form of national state which actually emerged; (2) a political federation or empire

controlled, if only loosely, from a single center; (3) a theocratic federation—a common-wealth—held together by the structure of the Catholic Church; (4) an intensive trading net-work without large-scale, central political organization; (5) the persistence of the 'feudal' structure which prevailed in the thirteenth century." He went on to argue: "The structure which became dominant in Europe after 1500, the national [*sic*] state, differed from these alter-native possibilities in several significant ways: (1) it controlled a well-defined, continuous terri-tory; (2) it was relatively centralized; (3) it was differentiated from other organizations; (4) it reinforced its claims through a tendency to acquire a monopoly over the concentrated means of physical coercion within its territory" (1975a:26–27). In a later work, Tilly admits that it was a mistake to characterize such states as "national" and that it might have been better to have called them "consolidated" states (1994:5).

28. Tilly's periodization was as follows: "The main rhythm, then, has three beats; (1) the formation and consolidation of the first great national states in commercial and military com-petition with each other, accompanied by their economic penetration of the remainder of Europe and of important parts of the world outside of Europe roughly 1500 to 1700; (2) the re-grouping of the remainder of Europe into a system of states, accompanied by the extension of European political control into most of the non-European world, save those portions already dominated by substantial political organizations (e.g., China and Japan): roughly 1650 to 1850; (3) the extension of the state system to the rest of the world, both through the acquisition of formal independence by colonies and clients, and through the incorporation of existing powers like China and Japan into the system: roughly 1800 to 1950. … Europeans played the major part in creating the contemporary international state-system, and presumably left the imprints of their peculiar political institutions on it" (1975b:637–38).

29. This shrinkage in the number of states was not restricted to Europe. When India be-came an independent nation-state in 1947, it was by the merger of more than four hundred in-dependent princely states.

30. I am clearly referring here to what became the dominant conception of the order of nation-states.

31. The argument for the national/international connection has been developed at some length in Malkki 1994.

32. Of these twinned concepts, nationalism/internationalism and state/interstate, it is inter-nationalism that has received the least attention. In fact, scholars of nationalism have so far paid more attention to ethnic or subnational identities than to transnational or international ones (Malkki 1994 is an exception; see also Gupta 1992). Given this fact, there is still a lot of ground to be covered before the emergence of studies that treat the interstate and international systems as being constitutive, rather than external, aspects of the nation-state (but see Waller-stein 1991a:139–57, 184–99).

33. Manzo points out that "reasoning man" has been the ultimate site of sovereignty in lib-eral thought, and the extension of sovereignty to other agencies like the state, the community, or the people has taken place either by extending the reach of "reasoning man" (for example, via the social contract to the state) or by drawing an analogy between the institution and the individual. It is for this reason that "a discussion of 'sovereign states' in anything other than individualist terms is so notoriously difficult" (1991:7).

34. The particular people who were representatives of that other sovereign republic (who enjoyed "diplomatic immunity") were also subject to the laws of their own nation-states. The notion of "diplomatic immunity," with its medical metaphor of an infectable body, is itself worth closer analysis. I owe this example to Ruggie (1993).

35. See in particular Xenos 1996 for a discussion of refugees and the nation-state. Krasner

(1995:117) goes further in suggesting that every major peace treaty has compromised the West-phalian model of territorial sovereignty.

36. The ethical questions raised in and by "the contemporary, unstable post-sovereign condition" are explored in Shapiro 1994.

37. I fully agree with Krasner (1995) that very few nation-states, particularly in the Third World, actually managed to accomplish all these tasks. I would argue, however, that these ideals are becoming problematic even for those powerful states which had come closest to the model of the Westphalian state.

38. Agnew and Corbridge state a very similar position when they write that "globalization and fragmentation do not signal their terminal decline; the Final Fall of the territorial state. But at the same time … the world that is in the process of emergence cannot be adequately understood in terms of the fixed territorial spaces of mainstream international relations theory (and international political economy)" (1995:99). In a similar vein, the argument about whether states will obstinately remain or become obsolete is criticized by Walker because these binary positions "share the same spatial imagery, an imagery rooted especially in seventeenth- and eighteenth-century ontological traditions" (1993:126). Walker and Mendlovitz (1990a:2) have put it very well: "State sovereignty offers only a misleading map of where we are and an even less useful guide to where we might be going."

39. If only for the purpose of scholarly persnicketiness, I note that the quote is from the drunken porter's speech in *Macbeth*, act 2, scene 3.

40. This last point would seem to indicate a situation that is "poststate" rather than "post-national."

41. Tilly argues that there are three possibilities for the future of European states: "(1) proliferation of states matching the more bellicose and/or diplomatically successful of those populations; (2) continuation of the long-term trend toward consolidation into a decreasing number of homogenizing states, the limit being a single homogenizing state; (3) detachment of the principle of cultural distinctness from that of statehood" (1992:705).

42. The same policies have been promoted in the rest of the world by North-controlled multilateral institutions through a neoliberal agenda.

43. Nandy says: "Some scattered non- or post-modern concepts of state have, however, begun to emerge in response to the crisis of the nation-state in our times. For while it is an open question what forms the post-modern state will take, there is little doubt that the dominant concept of the state will have to be drastically altered … in response to the larger processes of democratization going on all over the world" (1992:271). Walker (1993:154) makes much the same point, arguing that democracy cannot be rethought without fundamentally reconstituting ideas of state sovereignty.

44. Tilly contends that even in Europe, no large state "ever actually became a homogenous nation-state" (1992:710). See also the persuasive argument put forward by Krasner (1995) in this regard.

45. I do not think that Foucault naively believed that the economy was actually managed for the common welfare of all. However, it is significant that the rhetoric of rule changed so that the ideal of government became one of management for the welfare of all.

46. Foucault (1991:100) says, "The population now represents more the end of government than the power of the sovereign; the population is the subject of needs, of aspirations, but it is also the object in the hands of the government, aware, *vis-à-vis* the government, of what it wants, but ignorant of what is being done to it."

47. The use of concepts such as "governmentality" and "discipline" to discuss global regulation is obviously similar, but not identical, to the concept of "international regimes" (Krasner

1978; Young 1989). For criticisms of the regimes literature, see Agnew and Corbridge 1995; Ruggie 1982; and Walker 1993. Keck and Sikkink (1993) propose the notion of an "issue network" to highlight the role of nonstate actors in global environmental and human rights issues.

48. I am referring to what Young (1989:13) has termed an international order rather than an international regime.

49. The description that follows of the setting up of the new institute is taken from Khor 1995.

50. The collaboration between the KRRS and the Third World Network is a good example of a process described by Keck: "The reconfiguration of social struggles as environmental issues opens up new political resources and new allies for their protagonists. Labeling struggles as 'environmental' can change the grid of political and social relations in which they are embedded" (1994:97).

51. I have borrowed the term "intermestic" from Sanjeev Khagram (dissertation proposal, 1993, Department of Political Science, Stanford). Coalitions of farmers, as well as the global activities of NGOs, indigenous groups, and others support Walker and Mendlovitz's (1990a:7–8) argument that political communities are being reshaped from their formalization in state sovereignty into a multiplicity of forms that are a response to "profound structural transformations on a global scale."

52. Because most of these protests have occurred after my last research trip to India, I am entirely dependent on reports in the press for the quotes that follow. These reports gave little indication of the structural positions of the "peasants" who participated in the rally, although the fact that they were followers of the BKU and the KRRS would tend to place them among the better-off, landowning segment of the rural population. Many well-off farmers in Alipur, particularly jats, were enthusiastic supporters of the BKU.

53. Joshi's language befits a former UN official who returned to farming and took up the cause of agriculturists against urban and industrial interests.

54. Farmers in Karnataka (supporters of the KRRS) grow crops very different from those grown in western Uttar Pradesh, Punjab, or Haryana (supporters of the BKU). Sharad Joshi's followers are not the most powerful farmers in Maharashtra, the sugar barons who control rural politics and irrigation policies in the state, but from the stratum below them—that is, farmers who grow onions and other marketable food crops.

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New World, New Deal
A Democratic Approach to Globalization

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An Era of Fundamental Change

The United States enters the 21st century as the greatest beneficiary of the global system it helped create after World War II. As a power with unrivaled dominance, prosperity, and security, it must now lead the peaceful evolution of this system through an era of significant changes. Rapid shifts in technology and the embrace of markets by developing and formerly communist countries are shifting the balance of power among nations, between nations and nonstate actors, and between nations and global economic forces. New technologies are making the world much more interdependent. These technologies are accelerating the movement of goods, services, ideas, and capital across national boundaries. They are also displacing traditional security threats with nontraditional worries like international terrorism, organized crime, drug trafficking, and environmental degradation while strengthening the capacities of nongovernmental organizations (NGOs) to influence policy. Tension is mounting between the fixed geography of nation-states and the nonterritorial nature of global problems and their solutions.

The United States cannot shield itself from the effects of globalization. In today's interdependent capital markets, global perceptions of the stability of the American economy and the credibility of American economic policy can significantly affect the dollar's value and domestic interest rates. Despite its economic and military might, the United States cannot protect itself from global environmental problems like ozone depletion, climate change, and threats to biodiversity by acting alone.

The international economic challenges facing a new American president are twofold: first, to grasp the fundamental changes in the global economy, and second, to respond by fostering the conditions and institutions required for a world in which the United States can remain secure and prosperous. The central task of international economic policy is to help develop a new system of global economic relations—a task made essential, rather than simply desirable, by the enormous and irreversible changes now sweeping the world.

The Core

History indicates that a preeminent power cannot long maintain its global leadership without the support and cooperation of other nations in the pursuit of agreed-upon interests. Hence forging a consensus with other major powers on international economic objectives and how to share the costs of achieving them will be key tasks confronting the new president.

One of the new centers of power is a united Europe. On the economic front, the European Union (EU) is already a reality. A common currency, free trade, and more unified regulations are propelling cross-border flows of money, goods, services, and people. Cross-border mergers and restructuring are making European firms more competitive and European capital markets more flexible. With time, the EU will gain new members, including Poland, Hungary, the Czech Republic, Slovenia, Estonia, and Turkey. Other central European and Baltic countries will complete the transition from communism to capitalism and will either join the EU or establish close economic ties with it. Although Europe will not form a supranational state, policy coordination among member states will gradually increase. The EU already conducts trade negotiations as a single entity. With the creation of European economic and monetary union and the establishment of a common currency and central bank, Europe will increasingly act as one on financial and monetary issues.

The next Democratic president must define American economic relations with Europe in terms of the EU. As it has long done, the United States should encourage European unification, which is a stabilizing, modernizing force. But while Europeans share U.S. goals and values, they also increasingly resent American economic, political, and security hegemony. Thus the next president must work to ensure that Europe does not turn inward and that transatlantic economic, political, and security ties are strengthened. The Clinton administration has already laid the groundwork for ongoing high-level dialogue with the Europeans on economic cooperation and common global challenges through the New Transatlantic Agenda.

Russia is a thornier challenge. The West has a profound interest in Russia's transition to a market economy and has been trying to help. Although this transition has been marred by corruption, on-again, off-again reforms, and a dramatic 1998 financial collapse, progress has been made during the 1990s. Russian citizens enjoy more basic freedoms in speech, travel, and religion and are more connected to the rest of the world than at any time in the twentieth century. Russia has a functioning central bank and stock and foreign-exchange markets, and two-thirds of Russian property is no longer under state control. Moreover, the "meltdown" of the Russian economy predicted after its 1998 default has not occurred. In fact, over the last year, industrial production has increased, the trade balance has improved, and Russian firms show signs of restructuring. By exploding the myth in global capital markets that Russia is too big to fail, the 1998 financial crisis weakened Russia's corrupt oligarchs and forced the Russian economy toward greater efficiency in the face of more realistic budget constraints. Perhaps most important, those now vying for political leadership in Russia—even the Communists—agree that there is no real alternative to market reform.

The next Democratic president must continue America's constructive engagement with Russia, relying wherever possible on multilateral institutions like the IMF and on cooperation with other advanced industrial countries. American policy should continue to be multi-faceted, including trade; financial and technical assistance; educational exchanges; and programs to help Russia develop its civic institutions to combat corruption and safeguard an independent media. But America's interactions with Russia should not be based on illusions. Even with the West's financial and technical assistance, economic progress in Russia will be slow, unsteady, and largely dependent on political decisions made there. And the primary reason for the West's engagement with Russia is not economic—the Russian economy is too small to have much influence on global economic conditions—but geopolitical. Under the Clinton administration's leadership, more than 1,500 Russian nuclear warheads have been deactivated, and more than 300 missile launchers have been destroyed. Through the Cooperative Threat Reduction Program, the United States is working with the Russian leadership to try to ensure that Russian weapons of mass destruction do not fall into the wrong hands. Despite these successes, however, Russia poses a continuing nuclear-proliferation and security threat that must remain the central focus of American policy.

Asia poses quite different challenges. After a decade of stagnation, Japan is taking the first steps toward fundamental changes in its economic system. These changes are undermining traditional ways of doing business in Japan, including its lifetime employment system, its *keiretsu* supplier system, and its cross-shareholding system of "insider" corporate governance. Last year witnessed a dramatic increase in mergers and acquisitions in Japan, and foreign financial institutions were the dominant players. Foreign direct investment (FDI) increased sharply, although from a very low base. In a break with its past behavior, Tokyo has been promoting FDI, and the structural barriers to Japan's market that were a major irritant in U.S.-Japanese relations throughout most of the last quarter-century are gradually falling. Moreover, greater FDI will encourage imports into Japan by multinational companies operating there. Japan's imports will probably rise substantially as a share of its economy over the next decade, and U.S. firms—with their strong competitive position in information technologies—will likely win a significant share of Japan's market. Even during the 1990s, when slow growth depressed Japan's overall demand for U.S. imports, the U.S. surplus in services trade with Japan increased steadily, reflecting the strong competitive edge of American companies. Nonetheless, Japan's transition to a more open economic system will not make the substantial U.S.-Japan trade imbalance disappear, for two reasons. First, despite its economic difficulties, Japan has remained a formidable competitor in many global markets, and its painful restructuring will only increase its long-run competitiveness; and second, differences in aggregate growth rates and changes in the dollar-yen exchange rate will continue to be the major force behind changes in the bilateral trade balance.

During Clinton's first term, the United States engaged Japan in highly charged bilateral trade talks, relying on deadlines and threats. Both the goals of these negotiations and their sometimes combative tone reflected more than a decade of escalating trade deficits between the United States and Japan and frustration from American companies over structural barriers to Japan's markets. During Clinton's second term, trade

tensions began to ease as Japan's macroeconomic crisis intensified and as the terms of previous trade agreements were implemented. Currently, Washington is pursuing a two-pronged series of negotiations with Tokyo on deregulation and investment. Unlike prior talks, these negotiations have neither deadlines nor specific targets—nor much rancor.

The next Democratic president should continue this approach and maintain a high-level bilateral dialogue on trade. Such a dialogue lets both countries air complaints and avoid confrontation, thereby shielding other aspects of their relationship from commercial tensions. Regular high-level conversations also let the two countries develop joint initiatives on shared global economic challenges and common objectives for multilateral organizations like the WTO. Increasingly, the United States must treat Japan not just as an ally but as a partner in safeguarding economic, political, and military security in the Asia-Pacific, strengthening existing multilateral institutions, and building new ones.

The next Democratic president should continue Clinton's policy of constructive engagement with China. China's gradual emergence as a great power is a central feature of the new global system, and America's long-run interests are best served by China's stable evolution toward a more open, democratic system based on the rule of law. Constructive engagement with China does not guarantee this outcome, but it is the best option for increasing its likelihood. China may not be America's ally or partner—but as a result of constructive engagement, it has acted responsibly on issues of mutual importance like Hong Kong, North Korea, and Asia's financial crisis.

Constructive engagement is not an endorsement of China's human rights behavior. But revoking normal trading relations with China or blocking its WTO membership will not improve such behavior. Indeed, the opposite is true. Commercial considerations may seem crass when compared with human rights, but impeding commercial relations with China would impede the flow of information about Western culture, ideas, and business practices to China's emerging middle class and weaken reformers in the state and party leadership.

What about China's trade behavior? Don't large U.S. deficits with China imply that it engages in unfair trading practices? Won't China violate the rules of the multilateral system once it gains admission to the WTO and its trading partners lose leverage? Probably not. China does not enjoy a persistent current-account surplus—a defining characteristic of a mercantilist state. Moreover, China has encouraged FDI as part of its development strategy. Indeed, foreign-funded companies in China accounted for more than half of the growth of its exports during the last decade. China's openness to FDI will mean increased imports in the future. In the final WTO deal announced last November, China made big concessions on trade in manufactured goods, agriculture, and services. It further yielded to America's insistence on special protections against unexpected import surges from China. The consensus among China experts is that the WTO deal is a bold—some would say desperate—move by China's leaders to forge ahead with market reforms despite substantial adjustment costs. Finally, China's performance in other multilateral institutions indicates that it will honor its end of the bargain. And should violations occur, the United States will be able to turn to the WTO dispute-settlement mechanism to enforce compliance.

Another controversial aspect of economic relations with China is whether and how to regulate American exports of dual-use technologies—those with substantial military and commercial applications—to China and other countries that may pose security risks. Banning the export of such technologies seems to some the simplest way to safeguard American national security. But this approach is both ineffective and counterproductive. The United States is not the sole source for such products, so a unilateral ban would merely drive would-be importers to other suppliers. And for many dual-use goods, America's national security hinges on the success of their American producers in the commercial marketplace. Unilateral export controls undermine this success and thereby endanger national security. This realization lies behind the gradual easing of export controls by the American government since the end of the Cold War, a trend that the next administration should continue.

Like China, many other emerging nations are restructuring their political and economic systems, pursuing market policies, and shifting their world-views. The United States must work to engage these new players, together with existing powers, in the processes and institutions on which governance of the global economy depends.

Two of these new players—India and Brazil—are virtually certain to develop significant regional, if not global, influence and are strategically important to the United States. India has the smaller economy of the two but seems closest to a sustained breakthrough in economic growth. More rapidly than is generally realized, India is likely to become an important factor in the strategic equation in Asia as a whole. And Brazil, as a result of its size, economic development, and leadership of the Mercosur trade bloc, has already become an important factor in Latin America. Over time, other nations like South Korea, Mexico, and South Africa will probably grow in influence and become part of the complex coalitions of nations required to address global economic problems.

Putting It Together

The next Democratic president must strengthen America's alliance with the other major players—Europe and Japan—to reshape existing multilateral institutions and rules and create new ones as necessary. Emphasizing cooperation with these nations will also discourage them from turning inward or creating competing economic blocs. The United States, Europe, and Japan still account for about two-thirds of global GDP. They have similar levels of per capita GDP, effective legal and regulatory regimes, and highly developed capital markets. All trade and invest more with each other than with other regions of the world, and all are becoming information and network economies. The United States, Europe, and Japan should, therefore, be able to agree on many of the new challenges posed by globalization and the information revolution; negotiate free-trade areas in services, investment, and electronic commerce; adopt common guidelines for intellectual property and privacy; develop common regulatory standards in sectors such as biotechnology, the environment, health, and food safety; and agree on qualifications for professions and industries. New forms of cooperation and joint decision-making among these three great powers should be

carefully designed to support the multilateral system, and agreements among them should be open to participation by other countries or adoption by other multilateral institutions.

Historically, the G-7 group of highly industrialized nations has promoted economic cooperation among the United States, Europe, and Japan by engaging their heads of state in annual discussions about mutual concerns and creating working groups in each nation to develop mutual solutions. In recent years, however, the G-7 process has begun to lose its relevance because it excludes other nations important to the global economy. Because an ongoing, high-level dialogue among the heads of the world's major economic powers is important to the United States, the next Democratic president should encourage the G-7 to broaden its membership to include Russia (which is already included in most discussions), Brazil, China, and India.

The recent failure of the WTO talks in Seattle demonstrates the foolishness of launching global trade talks before developing a consensus on the issues among the United States, Europe, and Japan—still the largest trading nations in the world. But the lessons of the Seattle debacle go deeper.

First, the low-hanging fruit in multilateral trade negotiations has already been picked. In previous rounds, tariffs were slashed and quotas eliminated for most trade in manufactured products. Future negotiations will focus on agriculture and services—sectors that are politically sensitive and highly regulated by individual countries, including the United States—and will involve such traditionally domestic issues as antitrust policy, consumer safety, and other regulatory questions. Crafting multilateral agreements on such issues will be a long, painful process. And enforcing compliance with such agreements, which require nations to change entire areas of domestic law, will prove much harder than enforcing compliance with previous agreements barring overt trade barriers. Establishing a permanent executive committee within the WTO to replace the loose ambassadorial mechanism that currently proposes new multilateral trade talks could help. And the pointless practice of holding biennial WTO meetings at the ministerial level, even when there is nothing substantive to discuss, should end.

Second, given the complicated nature of future issues and the unwieldy number of future participants, the "global round" approach to trade talks—involving all WTO participants in a comprehensive agenda requiring bargains across several sectors—may have outlived its usefulness. Since it will be so difficult to forge consensus on the agenda for another global round, negotiations focused on liberalizing trade in individual sectors are an attractive alternative. In recent years, such negotiations have produced significant agreements in the diverse areas of information technology, telecommunications, and financial services. Moreover, since there is still much to do to implement these agreements, consolidating their achievements may be the best way to strengthen the multilateral trading system and achieve real progress over the next few years.

Third, to fight the burgeoning backlash against globalization and build public trust, WTO operations must become more transparent. At the same time, new multilateral approaches must be developed to address global concerns in other areas such as the environment, labor rights, and human rights. The next Democratic president

should encourage such efforts while making sure that the WTO maintains its focus on trade. The WTO exists to develop and enforce trade agreements, and such agreements exist to foster trade. The WTO is not the appropriate forum for other issues, although it could adjust over time to permit trade restrictions to enforce multilateral pacts on issues negotiated elsewhere.

In the meantime, the United States should eschew unilateral trade restrictions, including sanctions, to compel other nations to comply with American laws on the environment, labor practices, or human rights. During the last several years, America has imposed some form of unilateral economic sanctions against 26 countries, accounting for half the world's population. These sanctions have not achieved their goals; indeed, sanctions often harm exactly those they seek to help. And sanctions have cost the United States about $20 billion in lost exports, 200,000 jobs, and the goodwill and trust of its allies abroad.

Finally, the next Democratic president must continue to educate the American public about the ways the U.S. economy is helped by enforceable multilateral trading rules. As the largest exporting country and the one with the lowest trade barriers, the United States reaps the greatest benefits from trade liberalization. The more countries trade with one another, the better off they are. But the more they need multilateral rules to settle disputes, the more these rules influence domestic practices. Still, the WTO is not a world government that can override or proscribe its members' laws. If the United States loses a case before the WTO, it can either retain its domestic laws and accept trade sanctions from the complaining nation or adjust these laws to eliminate discrimination against foreign producers.

Regional economic integration can complement and spur multilateral liberalization. It can also contribute to political stability. For these reasons, the next Democratic president should build on the efforts of the Clinton administration to promote regional cooperation and liberalization in both Asia and Latin America. The Asia-Pacific Economic Cooperation forum is the basis for a sound economic strategy in the Pacific basin. Its membership boasts a number of important regional players (among them China, Japan, South Korea, Mexico, and the members of the Association of Southeast Asian Nations), it provides a useful forum for the region's heads of state, and it is committed to trade liberalization and cooperation in fields from telecommunications to basic infrastructure.

Building on the success of the North American Free Trade Agreement, the United States has convinced Latin American countries to agree on a broad economic agenda whose centerpiece is the creation of a Free Trade Agreement for the Americas (FTAA), with additional cooperation on the environment, human rights, crime, and other global issues. The next Democratic president should accelerate the FTAA process, which has been hampered by the absence of fast-track trade authority. Without such a process, American influence in the region will diminish, and the likelihood of competing economic zones will increase.

For Richer, for Poorer

As globalization has intensified, the gap between per capita incomes in rich and poor countries has widened. Although this trend has been around for the past two centuries, it has accelerated in recent years. For the many emerging countries that already have the institutions and income levels to attract private capital and the education levels to prosper in the new information age, the private sector will fuel continued economic development. Indeed, for most of these countries, the economic development problem—although substantial—is best understood as an internal poverty problem. But this is not so for the nations of Africa, many of which are being left behind.

What should the next Democratic president do to address human needs and spur economic development in the most impoverished nations? First, the White House should espouse complete debt forgiveness for the world's poorest nations. Second, the president should lobby to increase America's inadequate foreign-aid budget and redirect it toward programs to meet basic human needs—for example, a U.S.-led effort among the developed nations to counter the AIDS epidemic in Africa or to establish a special fund to help the poorest nations honor multilateral environmental agreements. Third, the president should work with other advanced nations to reduce tariffs, ease antidumping penalties, and lower quotas on trade with developing countries. Finally, the administration should foster cooperation with the NGOs that already deliver more development assistance than the entire U.N. system, including the World Bank and the IMF.

Earth in the Balance

The next Democratic president should establish a bipartisan group of experts to assess the lessons learned from recent financial crises, evaluate the adjustments already under way, and recommend additional changes. At the same time, the president should pledge America's commitment to the World Bank and the IMF, emphasizing their importance while recognizing the need for further reform. Such reform should be guided by two considerations. First, these institutions must adjust to the vastly greater scope and scale of private cross-border capital flows. Second, they must find ways to engage more of the public in the countries to which they lend—both to use their resources more efficiently and to help promote the stable civil societies on which successful economic development depends.

A growing number of environmental problems—ozone depletion, global climate change, threats to biodiversity—are international in scope and require cross-border solutions. Industrial countries, including the United States, are disproportionately responsible for most of these environmental problems, but developing countries are also rapidly damaging common environmental resources. Solutions, therefore, require the participation of both developed and developing nations. But since the costs and benefits of addressing common environmental problems vary among countries, as do the available resources, global agreements must include effective transfer mechanisms and flexibility about the methods used by different countries to achieve environmental targets.

No vehicle exists for nations to negotiate new multilateral pacts on environmental issues. That is one big reason why environmentalists have focused on the WTO. But using the WTO as the forum for multilateral environmental negotiations both endangers further trade liberalization and raises the risk that trade will be restricted in the name of environmentalism but in the service of protectionism. To head off these risks, a new Democratic president should propose creating a new Global Environmental Organization to develop and enforce new international agreements on specific problems, using the successful Montreal protocol on slowing ozone depletion as a model.

In recent years, a growing number of NGO at home and abroad have called for a set of internationally recognized and enforced labor standards that would ban child labor and sweatshops and support workers' rights to organize. Logically, labor rights and standards are development and political issues, not trade issues. There is no evidence that trade undermines labor standards and leads to an international "race to the bottom." In fact, the opposite is true. Most global trade still occurs between developed countries, which enjoy the highest wages, labor standards, and productivity levels. And as trade and integration in the global economy have helped poor countries develop, their wages, productivity, and labor standards have improved. Developing countries that have strengthened their labor standards have done so because of more trade and integration, not less.

Despite such evidence, labor standards will move up the agenda of international economic negotiations as global integration continues. And the next Democratic president will have to be sensitive to the desires of both NGO and organized labor for global workers' standards. Given the opposition of most of the rest of the world, however, this will not be easy. So Clinton's heir should continue to promote his reasonable Seattle approach of establishing a multilateral discussion group to examine some labor rights issues, including child labor and sweatshop conditions. The group should include the International Labor Organization, the United Nations, and the World Bank, and it should be charged with reporting its findings to the WTO by a specified date. Second, the president should encourage the private sector to develop labeling systems and codes of conduct certifying compliance with core labor standards. One promising effort is a program called Social Accountability 8000, launched by the Council of Economic Priorities and a group of influential American companies to encourage firms to comply with labor and human rights standards. Another is the United Nations' proposed Global Compact with Business, under which the U.N. will help multinational companies meet internationally accepted principles of human rights, labor practices, and environmental standards.

Third, the president must continue to educate the American people about the way trade boosts labor standards by highlighting American firms that have improved working conditions in their foreign operations. Polls indicate that most Americans would rather buy from companies committed to ending worker abuses and that American consumers would be willing to pay somewhat more for products made in worker-friendly environments. In addition, a growing number of American multinationals recognize that bad publicity about working conditions in their foreign operations can damage their reputations and bottom lines. A new Democratic president

can effectively use the bully pulpit to shine the spotlight on American firms that are doing well by doing good and encourage a "race to the top."

Nations must also begin to work with one another and the business community to define appropriate policies for the world of e-business. Without cooperation, different policy regimes will develop within different regions and nations, each attempting to govern phenomena that are inherently transnational. Different sets of rules will in turn generate unnecessary transaction costs and slow the diffusion of wealth and knowledge made possible by the new technologies.

To date, the Clinton administration has avoided regulation of the networked economy at home and made the case for a similar approach abroad. American officials had hoped to include digital issues on the agenda for the next global trade round, but that has been delayed by the failure of the Seattle talks. In addition, the Seattle discussions suggest that even when a new round begins, negotiations will focus on highly visible, politically contentious issues such as agriculture, textiles, and dumping that traditionally dominate trade debates, rather than on digital issues.

Therefore, it is time to develop a specific multilateral process focusing exclusively on such issues. This should be a principal objective of the next Democratic president. There are three logical steps: first, establishing a trade and investment round within the WTO focusing specifically on e-commerce; second, developing a set of basic principles for such talks, with a broad agenda including crime prevention, privacy, intellectual property, taxation (including the possible establishment of a multilateral tax clearing-house), and dispute settlement processes; and third, providing access to the networked economy for all nations and regions. The last step will require targeted lending programs funded by the World Bank, NGOs, and developed countries to help the poorest countries build the necessary infrastructure.

Stay on Target

The United States has benefited from globalization. Throughout much of the 1990s, exports accounted for about a third of U.S. growth. Even when American exports slowed in response to recessions in emerging markets, the same financial crises causing these recessions also increased flows of capital into American financial markets and reduced import prices for American consumers, fueling America's continued economic expansion during the last three years. This expansion—now the longest in the nation's history—has produced the lowest unemployment rate in more than 30 years and raised incomes for all groups of American workers, including the least skilled. True, the nation's trade and current-account deficits have hit record levels, but these primarily reflect the relative strength of the American economy compared to its trading partners and the resulting strength of the dollar, not an increase in protectionist barriers abroad.

It is easy to understand why a populist backlash against globalization has taken hold in much of the world, plagued by an endemic poverty made worse by recent contractions. As hundreds of millions of people in emerging markets have seen their jobs and incomes decimated by global financial shocks, modern information

technologies have shown them images of American prosperity—and of American officials and business leaders lecturing them about the necessity of painful sacrifice. Signs of an emerging backlash against globalization in the United States, although perhaps harder to justify, are inflamed by some of the same concerns: rising income inequality, job insecurity in a rapidly changing and harshly competitive environment, and a sense of powerlessness and uncertainty about the future.

Economic integration among nations, although beneficial overall, does create winners and losers. And even many winners fear that the next wave of change spawned by footloose capital and technological change will make them losers. To allay such concerns about globalization, the next American president must design policies to sustain America's expansion and give Americans the tools they need in the global marketplace. Among the most important of these are lifetime education and training opportunities, portable and fair pensions and health-care benefits, and a safety net to support incomes during periods of adjustment or recession.

At the same time, the next president must work with the leaders of other nations to develop multilateral agreements and institutions to ease the economic downsides of globalization and address new global issues. As President Clinton noted in his 1998 speech before the Council on Foreign Relations, the multilateral system must evolve toward a kind of "Global New Deal." The painful experiences of many transition economies and the unexpected financial crises of the 1990s have reminded the world that to work well, markets require a strong commitment to the rule of law, transparent financial institutions, legitimate corporate and political governance structures, and adequate social safety nets. As the new millennium begins, a new Democratic president will have the opportunity to lead the world in creating institutions and policies to sustain a more equitable process of globalization built on the marvels of the market and modern technologies.

Individualism, Holism, and Environmental Ethics

Kristin Shrader-Frechette

Environmental Holism

Neoclassical economists have been telling us for years that if we behave in egoistic, individualistic ways, the invisible hand of the market will guide us to efficient and sustainable futures. Many contemporary Greens also have been telling us that if we behave in holistic ways, the invisible hand of ecology will guide us to healthy and sustainable futures. In this essay, I argue that neither environmental individualism nor first-order environmental holism—to which many ecologists and environmentalists appear to subscribe—will provide environmental sustainability. There is no invisible hand, either in economics or in ecology. Humans have no guaranteed "tenure in the biosphere" (Passmore, 1974, pp. 75–96). Likewise there is no philosophical "quick fix" for planetary problems, either through the environmental individualism of Feinberg (1974), Frankena (1979), and Regan (1983), or through the first-order environmental holism of Callicott (1989) and Leopold (1968). The correct path is more complex and tortuous than either of these ways. I argue that the most ethically defensible way to reach planetary protection and a sustainable environmental future probably is through a middle path that I describe as "hierarchical holism."

Environmental Individualism and Its Problems

As expressed in a classic article by Joel Feinberg, the cornerstone of environmental ethics in the individualistic tradition is the view that because only individual, sentient beings have interests, therefore only they can be said to be moral patients, beings to which we have duties (Feinberg, 1974, pp. 43–68). William Frankena's argument here is that we owe no moral consideration to beings or systems that are merely alive but have no conscious experience because they are incapable of pleasure or suffering. Frankena maintains that to accord the status of "moral patients" to systems or nonconscious beings is to beg the question of ethical value and to make a claim that is simply "incredible" (Frankena, 1979, pp. 3–20).

Environmental individualism, however, is questionable on the grounds of both its philosophical intuitions and its consequences for environmental protection and sustainability. From a philosophical point of view, the environmental individualism of Frankena and Feinberg is suspect because it relies in large part on at least two problematic intuitions or postulates:

P1: *We cannot harm a being if it is not capable of consciousness*

P2: *Physical or psychological suffering is the only type of harm that we impose on another.*

Contrary to **P1**, however, it seems plausible to claim that if we destroy or even increase the probability of death of a living, nonconscious being—such as a large old tree—we cause it harm. Moreover we seem to cause harm to such a being for the same reason that we cause humans harm—by increasing their probability of death—even when they do not know it and even when there is no physical or psychological pain or suffering involved. As all those conversant with quantitative risk assessment realize, increasing my average annual probability of fatality—induced by exposure to a particular pollutant such as benlate, for example—clearly harms me, even when I do not know it and even when there is no clear physical or psychological harm involved. I am harmed by having my life shortened or my death made more probable, even if such shortening or heightened probabilities are associated with no obvious physical symptoms of suffering. To ignore such probabilities is to presuppose that harm is simpler, more deterministic, more physical, and more obvious than it is. Contrary to what Feinberg, Frankena, and Parfit suggest, physical and psychological suffering does not appear to exhaust the category of harm (Parfit, 1984; Shrader-Frechette, 1987, pp. 50ff.; 1988, pp. 75–96). It seems equally plausible to claim that increasing the probability of death is an instance of harming a being. Likewise, to presuppose that consciousness or sentience is necessary for a being to be harmed is to presuppose a purely psychologistic definition of "harm." Psychological responses may be a sufficient condition for a person's being harmed, but clearly they are not a necessary condition. The presupposition errs because it confuses being harmed with knowing that one is harmed. Knowing that one is harmed does not seem to be a necessary condition for being harmed. And if not, then ethical individualists may err in assuming that beings can be harmed only if they are conscious and capable of suffering (Shrader-Frechette, 1988, pp. 75–96).

The environmental individualism of Frankena and Feinberg also appears problematic because it is premised on a metaphysics and science that presuppose that we harm individual sentient beings "one at a time." On the contrary, we can jeopardize obvious ecological interdependencies, system relationships, and cases of coevolution, despite our inabilities to describe fully these relationships through precise, predictive, general ecological theory (Shrader-Frechette and McCoy, 1993). These interdependencies show that the consequences of our actions can affect not merely individuals but a variety of biotic systems and relationships—such as the carbon cycle and the nitrogen cycle—that could be considered as moral patients. Moreover, to say that one can harm the carbon cycle and nitrogen cycle does not seem any more metaphorical a

case of harm than to say that one has harmed the fuel-injection system of an auto-mobile or the due-process system of a nation. And if so, then there may be both philo-sophical and metaphysical grounds for questioning environmental individualism and for subscribing to some sort of ethical holism.

First-Order Environmental Holism and Its Problems

Even Frankena opens the door to some version of ethical holism. For example, he admits that G. E. Moore and W. D. Ross were not individualists in the classical ethical sense. Moore held that a beautiful world would be intrinsically good even if there were no sentient beings to enjoy it, and Ross claimed that a state of affairs in which happiness is distributed in proportion to merit or virtue is intrinsically good (Fran-kena, 1979, pp. 3–20; Moore, 1903, p. 27). If the insights of persons such as Moore and Ross are plausible, then ethical holism, as such, may not be as philosophically suspect as persons like Feinberg have alleged. We shall argue that what does seem problem-atic, however, are particular versions of holism, like that of J. Baird Callicott.

Callicott's first-order holistic environmental ethics, following Aldo Leopold, "locates ultimate value in the biotic community and assigns differential moral value to the constitutive individuals relatively to that standard" (Callicott, 1989, p. 37). He says that, "in the last analysis, 'the integrity, beauty, and stability of the biotic community' is the measure of right and wrong actions affecting the environment" (p. 58). In Calli-cott's view, the biotic community has not only moral considerability but primacy; he writes: "not only are other sentient creatures members of the biotic community and subordinate to its integrity, beauty, and stability; so are *we*. … [H]uman beings are equally subject to the same subordination of individual welfare and rights in respect to the good of the community as a whole" (pp. 92–93). In other words, he has a first-order ethical principle to optimize the welfare of the biotic community. Callicott has no second-order principles to use in adjudicating disputes between community and individual welfare because individual welfare is always subservient to community wel-fare. Thus Callicott subscribes to a first-order environmental holism.

Defending Leopold's (and his) ethics as Darwinian and sociobiological, Callicott argues persuasively that this holistic ethics is a natural result of the evolutionary extension of the boundaries of the moral community. Once we see land as a "biotic community," says Callicott, "the land (or environmental) ethic" emerges. The "con-ceptual and logical foundations of the land ethic," he says, are evolutionary and eco-logical biology, "a Copernican cosmology, a Darwinian protosociobiological natural history of ethics, Darwinian ties of kinship among all forms of life on earth, and an Eltonian model of the structure of biocenoses all overlaid on a Humean-Smithian moral psychology. Its logic is that natural selection has endowed human beings with an affective moral response to perceived bonds of kinship and community member-ship and identity; that today the natural environment, the land, is represented as a community" (Callicott, 1989, pp. 82–83). More specifically, Callicott argues that the bi-otic community, currently viewed as the ecosystem, has moral considerability because it is the object of a specially evolved public affection that all psychologically normal humans have inherited from a long line of primates (Callicott, 1989, p. 86). Providing

for the moral considerability of nature as a whole, however, is problematic because this value apparently must be grounded in some property. Yet anyone could reasonably deny that a particular natural or metaphysical property, e.g., "stability," is truly good. To counter this difficulty, Callicott argues that "good and evil, like beauty and ugliness, rest in the final analysis upon feelings or sentiments which are, as it were, projected onto objects, persons, or actions and affectively 'color' them" (Callicott, 1989, p. 160). In so arguing Callicott realizes that "intrinsic or inherent value in nature in the strict, objective sense of the terms must by definition be abandoned if one assumes a Humean subjectivist axiology" (Callicott, 1989, p. 161). Nevertheless, he says, this subjectivist axiology allows natural biotic communities to "be valued *for themselves*" (p. 163). It also escapes relativism, according to Callicott, because sociobiology has achieved a "consensus of feeling" through the "biologization of ethics." Human ethical feelings, in turn, "have been standardized by natural selection" (p. 164).

Although first-order environmental holism, as such, may be ethically defensible, there are problems with some prominent versions of it espoused by philosophers and environmentalists such as Callicott. Callicott's ethics, for example, fails because: (1) there is no biologically coherent notion of "community" robust enough to ground either contemporary scientific theory in community ecology or environmental ethics; (2) it is not possible to safeguard the "rights" of biological communities; (3) in relying on natural-selection mechanisms to deliver it from relativism, Callicott's evolutionary ethics has lost its normative dimension; and (4) his version of ethical holism appears to sanction what Regan calls "environmental fascism." Let's examine these four points in order.

Following Leopold (1968), Callicott argues that all creatures are subordinate to the integrity, beauty, and stability of the biotic community. This first-order ethical imperative is problematic from a biological point of view because there is not a clear notion of balance, integrity, stability, or community. There is, for example, no clear sense in which one can claim that natural ecosystems proceed toward homeostasis, stability, or balance and no consensus among ecologists on the ecosystemic view of balance or stability (Peters, 1991; Shrader-Frechette and McCoy, 1993, chp. 2; Shrader-Frechette and McCoy, 1992, pp. 184–199; Taylor, 1986, p. 299), although there has been significant philosophical work on these concepts (Westra, 1994). Likewise, there is almost no support for the diversity-stability view held by MacArthur, Hutchinson, and Commoner (Connell, 1978, pp. 1302–1310; Goodman, 1975, pp. 237–266; Levins, 1974, pp. 123–138; Lewin, 1984, pp. 36–37; May, 1973; MacArthur, 1955, pp. 533–536; McIntosh, 1985, p. 142; Norton, 1987, chp. 4, sect. 2; Paine, 1969, pp. 91–93; Sagoff, 1985a, pp. 107–110; Soulé, 1986, pp. 6–7; Taylor, 1986, p. 8). The reasons for the disfavor attributed to the view of MacArthur et al., are both empirical and theoretical. Salt marshes and the rocky intertidal are two of the many counterexamples to the diversity-stability view (Sagoff, 1985a, p. 109; Sagoff, 1985b, p. 81), and empirically based counterexamples have multiplied over the last two decades. May, Levins, Connell, and others have seriously challenged the diversity-stability hypothesis on both mathematical and field-based grounds (Connell, 1978; Levins, 1974; May, 1973; McIntosh, 1985, pp. 187–188; Sagoff, 1985a, p. 109). Even though some laypersons and policymakers appeal to the hypothesis, most ecologists have either repudiated it or cast strong doubt on it (Commoner, 1971, p. 38; Myers, 1983; U.S. Congress, 1973).

Doubts about balance and stability have arisen, in part, because ecologists cannot say what it would be, in a noncontroversial, precise, and nonquestion-begging way, to hinder some biological "balance," "stability," or "integrity." Not only are there a variety of competing definitions for each of these terms, but whether a particular term is applicable in a specific situation is largely a function of the temporal and spatial scale that is chosen. Moreover, communities and ecosystems regularly change and regularly eliminate species. Nature does not merely extirpate species or cause them to move elsewhere because their niches are gone. And if not, then there are no clear *ecological* grounds for defining and preserving some partial notion of balance or stability. Hence, it is not clear how Leopold's and Callicott's appeal to these ecological concepts can help defend a holistic environmental ethics. It will not do to say that what happens naturally is good, whereas what happens through human intervention is bad; this would be to solve the problem of defining "balance" or "stability" in a purely stipulative or *ad hoc* way. Nor can the criterion be merely that it is wrong for humans to do quickly (e.g., cause lake eutrophication) what nature does more slowly. One also would need both second-order ethical arguments (given by neither Callicott nor Leopold) that accelerating ecosystemic changes is bad, even if the changes themselves are natural, and second-order arguments that a particular account of what is "natural" is defensible.

Another conceptual problem besetting environmental appeals to ecological balance, wholeness, or integrity is that ecologists must take into account thousands of different communities, species, and individuals, relative to the health or balance of an ecosystem or the biosphere. It is not clear how to define the health of a system (as opposed to that of an individual), because system health is relative to some specific goal. Nor is it obvious how to define the system at issue. The ecological problem of defining the system at issue is analogous to the economic problem of defining a theory of social choice and choosing some "whole" that aggregates or represents numerous individual choices. Defining an ecological "whole" to which Callicott and Leopold can refer is especially problematic, both because the biologists (e.g., Clements, Elton, Forbes) cited by Callicott to explicate his views are no longer accepted by most contemporary scientists as having correct views about ecological communities, and because the contemporary variant of Clements's position, the GAIA hypothesis, has been rejected by most ecologists as unproved metaphor or mere speculation. At best it is a hypothesis. They admit the scientific facts of interconnectedness and coevolution on a small scale, but they point out that particular ecosystems and communities do not *persist* through time. Hence, there is no clear referent for the alleged "dynamic stability" of an ecosystem or community (Goodman, 1975, p. 239; MacArthur, 1955; Norton, 1987, chp. 4 sect. 2; Shrader-Frechette, 1985, pp. 77–92; Shrader-Frechette and McCoy, 1993, chp. 2).

Moreover, it is not clear which (of many) alleged ecological communities whose balance or stability ought to be sought. One could seek to "stabilize" (whatever that is taken to mean) the ecosystem, or the association (McIntosh, 1985, pp. 44, 79, 107), or the trophic level, for example. Or, if one is a holist, then why should not the collection of communities and ecosystems be stabilized or optimized, namely, the biosphere? Optimizing the well-being of a particular community, however, does not lead to the

optimization of another community in the biosphere or of a particular association. If not, then Callicott has little scientific basis for choosing a given "whole" as the unit that is to be stabilized or optimized (McIntosh, 1985, pp. 126ff., 157ff., 181–82ff., 252; Shrader-Frechette, 1985, pp. 77–92). One can make a *value judgment* to optimize the well-being of a particular community or the biosphere, but this is just that, a *value judgment*. It is not part of an empirically defensible ecological science.

Admittedly, once one makes a value judgment about which particular whole one wants to stabilize or balance, it is obvious that specific ecological conclusions are valid within certain spatial and temporal scales. Nevertheless, a given ecological conclusion regarding balance or integrity, for example, typically holds for some "wholes" (e.g., communities) and for some temporal and spatial scales but not others. Ecologists cannot optimize the welfare of all the different wholes (each having a different spatial and temporal scale) at the same time. Because they cannot, there is no general level at which ecological problem solving takes place. Hence, there is no general temporal or spatial scale within which a stable "whole" is exhibited. Also, because there is no general, universal ecological theory to which one can appeal in defining the "whole" about which Leopold and Callicott speak, ecologists are forced to work on a case-by-case basis. They recognize that there is no universal level, across all communities, at which some balanced or stable whole exists. In part this is because numerous alleged "wholes," e.g., populations, exhibit density vagueness rather than density dependence, while other wholes do not (Strong, 1986, pp. 257–268). Also, many ecosystemic or holistic explanations are neither falsifiable nor even testable. For this reason, at least one scientist called ecosystems ecology "theological ecology" (McIntosh, 1985, p. 193). There is neither a clear definition of what it is to be balanced or stable, nor a clear definition of the whole that is allegedly balanced or stable. The absence of both definitions is attributable ultimately to the fact that theorists do not agree on the underlying processes that structure communities and ecosystems (Cody and Diamond, 1975; Gilpin and Diamond, 1984, pp. 298–315; Lewin, 1983, pp. 636–639; Simberloff, 1983, pp. 626–635; Strong, Simberloff, Abele and Thistle, 1984).

A second biological problem with Callicott's holism concerns his argument in favor of duties to the biotic community and against according rights to individual members of the biotic community. He argues against the latter because he says that it is not possible to safeguard the rights of each individual; he says that such a "safeguard" would stop all trophic processes beyond photosynthesis (Callicott, 1989, pp. 43, 51). The biological problem with Callicott's reasoning here is that nature does not respect communities either. There is strong biological evidence (e.g., fossilized pollens) of radical changes in community composition and structure throughout history (Graham, 1986, pp. 300–313; Strong, 1986). These changes, in turn, suggest that there is no such thing as a stable or balanced community "type" existing through time. Rather the types only appear stable because our time frame of examination is relatively short. Even if climate and environment remained the same, however, communities could not be classified into balanced or stable "types." Both spatial and temporal fluctuations undercut any universal notion of a stable or balanced community. And if so, then arguments analogous to those that Callicott uses against Regan can be used against him. Just as Callicott argues against Regan's individual rights, by saying that

nature does not respect them, so also we can argue against Callicott's notion of stable communities, by saying that nature likewise does not respect them. If nature does not respect ecological communities, we need specific arguments to show how and why humans can be expected to do so.

A third problem with Callicott's using biology to undergird his holistic environmental ethics is that he destroys the normative dimension of his ethics. This problem occurs because Callicott reasons, quite correctly, that in relying on a Humean notion of ethics, he is open to the charge of ethical relativism. He avoids this relativism by postulating that ethical uniformity/unanimity is achieved by means of natural selection. Callicott claims that "human feelings … have been standardized by natural selection" (Callicott, 1989, pp. 82ff.). His analysis fails to show that natural selection standardizes ethics in the requisite sense, however, because one can be neither morally blamed for doing something contrary to natural selection nor morally praised for acting in accord with natural selection. Either a certain ethical tendency is selected for, or it is not. As a result, behavioral uniformities that are explained through natural selection are descriptive, not normative. Hence Callicott may have saved his ethics from relativism, but at the price of its "oughtness" or normative character.

A similar normative problem occurs when epistemologists attempt to explain rules or norms of knowing by means of natural selection; their "evolutionary epistemology," apart from other difficulties, is naturalized, descriptive, and non-normative. It is no longer epistemology, but psychology (Bartley, 1987, pp. 24–25; Hookway, 1984, pp. 1–16; O'Hear, 1987, pp. 19–23). Similar to evolutionary epistemology, Callicott's evolutionary ethics cannot take account of the fact that arriving at ethical beliefs/actions relies on cognitive and evaluative aims, on anticipating experience, solving problems, and so on. The "evolution: ethics" analogy therefore breaks down because, although evolution does not operate according to ends or aims, ethics does. Evolution and natural selection ignore the contribution to reflective self-understanding of ourselves as agents of inquiry, even though this reflective agency is at the core of ethical knowledge (Hookway, 1984, pp. 13–15; O'Hear, 1987, pp. 27–29). Moreover Callicott's natural-selection explanation fails to explain how someone could make the *first* correct ethical guess or have the *first* ethical feeling; at best, natural selection could only explain later correct guesses or feelings (Skagestad, 1978, p. 615).

Evolution and ethics are also disanalogous in that, in ethics, we select theories/ behavior on the basis of hypotheses about the facts and our evaluations of them. In evolution, however, the facts themselves, neither our hypotheses nor our evaluations of them, are the guide. Hence, evolution is blind both to an organism's evaluations of the facts and to the adaptive need of the organism, whereas ethics is blind to the facts and can see only evaluations or hypotheses about the facts (Skagestad, 1978, p. 617). For all of these reasons, Callicott's appeal to natural selection to ground his ethics appears to create more philosophical problems than it solves.

Apart from natural selection, Callicott's and Leopold's versions of ethical holism also are problematic because they sanction what Regan calls "environmental fascism" (Regan, 1983, p. 262; Taylor, 1986, p. 118; Rolston, 1987; Taylor, 1986, pp. 45–46, 225–226, 246, 259, 281–282). If one follows Callicott's and Leopold's first-order ethical principle of subordinating the welfare of all creatures to the integrity, beauty, and stability of

the biotic community, then one subordinates individual human welfare, in all cases, to the welfare of the biotic community. This means that a second-order conflict over community versus individual welfare could not arise. With no second-order ethical principles to protect humans, under at least some circumstances, massive human deaths or violations of basic civil liberties could be justified, even required, on the grounds that allowing them would help check the population problem and contribute to the good of the biosphere. Such an argument has already been proposed by Garrett Hardin in his famous discussion of "lifeboat ethics" and by a number of "deep ecologists" following in the tradition of Thomas Malthus, Paul Ehrlich, and David Foreman (Hardin, 1974, pp. 561–568; Young, 1990, pp. 128ff.). Of course, Callicott denies that his ethics would lead to "environmental fascism." He claims that his environmental ethics presupposes that all existing systems of human rights would remain in existence (Callicott, 1989, p. 93). However, his verbal response here does not solve the conceptual problem, and for two reasons. First, it is inconsistent with his continuing claims for the priority of the biotic community. If the welfare of the biotic community takes priority over human rights, as he claims, then existing systems of human rights would no longer be in operation, contrary to Callicott's claims. Second, apart from inconsistency, it is impossible to maximize two variables and hence impossible to give priority position to both the biotic community and to human rights. If Callicott does the former, he can be accused of being an environmental fascist. If he does the latter, then he contradicts his own claims for the priority of the biotic community and is no longer the biocentric holist that he claims to be. The only way to recognize both community and human-rights values is to have second-order ethical principles and a priority ranking system that specifies the respective conditions under which holistic and individualistic ethical principles ought to be recognized. In the remainder of this essay, I shall sketch such a ranking system. It is a third position, a way of integrating holistic and individualistic ethics so as to safeguard basic human rights while recognizing environmental welfare.

Hierarchical Holism

We might call this integrated position "hierarchical holism" because it recognizes the plausibility of attributing inherent worth (therefore the status of moral patients) to systems and processes that are not sentient, yet it provides for a hierarchical or lexicographic ordering of various duties regarding humans, other beings, and environmental systems or processes. Several of the most prominent characteristics of this hierarchical holism are: (1) that it is based on a metaphysical rather than merely a scientific notion of the biotic community; (2) that it relies on an ethics that is both anthropocentric and biocentric; and (3) that it includes some second-order ethical principles capable of adjudicating conflicts among human versus nonhuman interests.

Because of all the ecological difficulties (already mentioned) with current scientific definitions of biotic wholes, their boundaries, and their processes, hierarchical holism relies on a metaphysical, not merely a scientific, account of biotic communities. As our earlier criticisms of Leopold's and Callicott's first-order environmental holism

reveal and as Arne Naess's criticisms of "ecologism" argue (Naess, 1989, pp. 26–27, 39–40, 130–33), there is no ecological conception of holism that is precise, predictive, and clear. Hence, our view of the biotic whole must be based on some metaphysical presuppositions about the value of various processes, systems, relationships, and species. Possibly ecologists are the best persons to make the metaphysical and value judgments about how to define this biotic whole; nevertheless, such judgments are based on expert opinion and values, not merely on scientific fact. As a consequence of such ecological judgments, hierarchical holism is not subject to the same scientific criticisms as Leopold's and Callicott's versions of holism discussed earlier.

Hierarchical holism also relies on partially anthropocentric accounts of ethical behavior because ecology is insufficiently precise and predictive regarding concepts such as equilibrium, homeostasis, stability, and community. Hence, we humans—given unavoidably human understanding of the natural world—must make our best guesses as to how to maintain some biotic health. Again, ecologists may be in the best position to offer opinions on this issue because of their professional expertise. The main point, however, is to "call a spade a spade": because of the problems with scientific or biocentric definitions of stability, our holistic ethics has a warrant which is metaphysical rather than purely ecological and which is unavoidably and partially anthropocentric rather than purely biocentric. As a consequence, our hierarchical holism, unlike other versions of holism, retains the full normative force of ethics.

In order to avoid the incoherence besetting the environmental ethics of all those who posit both holism and human rights but provide no clear and specific way to adjudicate conflicts, hierarchical holism provides some second-order principles. As a consequence, of course, it cannot postulate the "biotic equality" of ethicists such as Callicott or Paul Taylor (Taylor, 1986). Instead, it must establish principles specifying a hierarchy of duties, rights, and responsibilities. One possible second-order principle might be to give priority to strong human rights (such as the right to bodily security) over duties to any other environmental or biocentric goal, and to give priority to environmental and biocentric goals over weak human rights (such as rights to property). By following such second-order principles, we not only have a practical scheme for adjudicating environmental controversies, but also we have a rule that places the burden of proof on anyone who interferes with nature for any reason except to preserve strong human rights (Naess, 1989, pp. 26–27). There is no space here to defend the strong rights/weak rights framework, but Ronald Dworkin provides one possible justification (Shrader-Frechette and McCoy, 1993, chps. 6, 7, 9). Strong rights, on his scheme, are essential to human dignity and personhood; they are rights that can never be overridden. Weak rights are those that are not essential, that can be overridden if the common good demands it. One benefit of the strong rights/weak rights framework is that it allows us to avoid environmental fascism and to recognize the most basic human rights even though it calls for more stringent protection of the environment.

By giving priority to strong human rights over environmental welfare, and to environmental welfare over weak human rights, we appear to be following priorities that are similar to those of Naess and Sessions who argue that humans have no right to reduce the richness and diversity of the world except to satisfy vital human needs (Naess, 1989, ch. 1). Hence, our hierarchical holism appears consistent with deep

ecology, in at least some respects. For those who argue that we need a biotic equality, not a hierarchical environmental ethics, however, we can make several responses. First, Aristotle's basic intuition—that ethics requires us to treat equal beings equally—seems correct (Aristotle, 1973, pp. 1131a10–1131a30). Because humans are not equal to nonhumans as moral agents, or as free and responsible beings, or as having the capacity to suffer and be harmed, it is not obvious that they ought to be treated as equal moral patients. Moreover, treating all members of the biotic community equally is impossible, given the requirements for human food and shelter and the disturbance that accompanies meeting such requirements. Hence, in order to operationalize any environmental ethics, there are practical requirements for second-order principles; otherwise we would face the Scylla of environmental fascism or the Charybdis of being unable to adjudicate environmental controversies.

In addition to second-order principles there are, of course, a number of other important steps for converting hierarchical holism to a workable and practical environmental ethics that can be used as a basis for policymaking. One of the most important conditions for implementing hierarchical holism is that persons understand and accept a number of important principles of environmental education that illustrate the mutual interdependencies of the inhabitants of the planet (Palmer, 1992, pp. 181–186; Shrader-Frechette and McCoy, 1993, chp. 10). In the light of such interdependencies, it is obvious, for example, that protecting fish from dangerous pesticide runoff is essential also to protecting humans and vice versa. Understanding the necessity for sustainable agriculture and sustainable population growth is also a precondition for accepting the reforms entailed by implementing hierarchical holism (Harwood and the Committee, 1993). Environmental education thus is essential to implementing a new environmental ethics of hierarchical holism because without it, policymakers will face endless debates over coercive means of environmental management. Without education, presumably people would have no choice except for environmental management based on Garrett Hardin's principle: "mutual coercion mutually agreed upon" (Hardin, 1968, pp. 1243–1248).

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Indigenous Groups

Although anthropologists debate the utility and meaning of the word "indigenous," the discipline has its origins in the study of small, usually marginalized groups. Researchers operating within a Stewardian tradition often focus on how relatively restricted groups of people relate to a circumscribed environment. The enduring appeal of this framework is evident, for example, in Haenn's writing (Section 4). However, as anthropological ideas about isolated communities have changed, anthropologists consider indigenous people and their environments as located in complex, multilayered social processes. Still, during disputes over land and natural resources, the word "indigenous" continues to hold power. As the authors describe, the precise importance of what it means to be indigenous in a given setting requires close examination.

This section continues earlier authors' discussions of how cultural orientations act as a lens through which people see the world. The authors in this section consider how people identified as indigenous often carry a burden of having their cultural perspectives romanticized or denigrated. Indigenous people are often depicted as either inherently inclined toward environmental protection or incapable of grasping how their actions might be environmentally detrimental. Rarely are indigenous peoples seen as normal human beings, with all the complexity that human existence entails. Disempowered indigenous groups may be unable to argue against how their images and resources are exploited. At the same time, through today's globalized media and institutions, some indigenous groups are finding new sources of empowerment though not always in ways that please environmentalists.

The section begins with Kay Milton's theorizing about the relevance of cultural diversity in environmental management. Additionally, Berkes et al. outline the qualities of common property management regimes, a tenure system closely identified with indigenous land management. Suzanna Sawyer reports on the implications for indigenous sovereignty of oil exploitation in Ecuador. In Ecuador, indigenous people have formed a potent political force, in part, because of their association with multinational environmental groups. J. Peter Brosius takes a closer look at these connections, questioning how ideas of "indigenous" get appropriated and transformed by environmental campaigns for rain forest protection. In this section's polemical piece, Will Anderson counters indigenous claims to whaling rights in the United States. Anderson opposed a request by the Micah group, to the International Whaling Commission, for permission to kill one whale for ritual purposes. Finally, this section's ethical reflection includes David Maybury-Lewis's thoughts on the continuing importance of indigenous identities. Maybury-Lewis is a member of Cultural Survival, a group that defends indigenous groups throughout the world.

Cultural Theory and Environmentalism

Kay Milton

The prime motivation for this book was the conviction that anthropology can benefit the environmentalist cause; that it can help us to identify our responsibilities for protecting the environment and work towards their fulfilment. Environmentalists have operated largely in ignorance of what anthropology has to offer. In particular, their understanding of the human-environment relationship has not been informed by a knowledge of how culture mediates this relationship, and the absence of this knowledge has seriously undermined the arguments presented in the global environmental debate. It is appropriate to end this exploration by considering how the study of culture can help environmentalists to a better understanding of human ecology and a more informed discourse on the search for sustainable ways of living.

Dispelling the Myths

One of the clearest messages that anthropologists can give to environmentalists is that human beings have no "natural" propensity for living sustainably with their environment. Primitive ecological wisdom is a myth, not only in the anthropological sense, as something whose truth is treated as a dogma, but also in the popular sense, as something that is untrue, a fantasy. The reasons why the myth persists are easy to understand. In some contexts it provides support for political arguments, against industrialism and its associated developments, and in favour of autonomy for indigenous and traditional communities. But perhaps the main reason for its persistence is that it gives environmentalists hope that there is a ready-made solution to environmental problems, albeit one that is very difficult to achieve. The myth implies that if industrial societies could "get back" to a more "natural" existence, by emulating the practices and cultural perspectives of non-industrial peoples, then our difficulties would be solved. The knowledge generated by the comparative analysis of human cultures indicates that this is not so.

Does this mean that the message anthropology brings to environmentalism is essentially pessimistic? Not necessarily, for the message is not that environmentally

benign cultures do not or cannot exist, but that identifying them is not as easy as pointing to non-industrial peoples. An understanding of cultural diversity can be a source of ecological wisdom, but nowhere is this wisdom ready-made. It has to come from a knowledge of the range of possibilities, and an understanding of how human cultures and the environments in which they develop impact upon each other. It may be possible to manufacture sustainable ways of living out of bits and pieces selected from diverse cultures, but it would be unwise to attempt this without first understanding them in their original contexts, and appreciating the consequences of taking them out of those contexts. The discussion in this book does not point to a clear way forward. Anthropology could not, in any case, do this on its own; hence the need for "multidisciplinary" approaches that include the physical as well as the social sciences. But the arguments and evidence presented here do indicate ways in which anthropological knowledge might inform environmental discourse.

First, and most important, the assumption that some cultures are more natural than others is a damaging distraction and should be abandoned. It fuels established prejudices, reinforcing the divisions that sustain discrimination and conflict. It also creates the misleading impression that creating a sustainable way of life is a matter of "going back", and this makes it harder to persuade many people of its value, particularly those who, in the minds of many environmentalists, most need to be persuaded: those who pursue the equally distracting ideal of "progress" in the form of economic growth. The alternative is to see nature as the all-encompassing scheme of things to which all human cultures and practices, as well as non-human species and physical processes, belong. In this view, a dam built by people is as natural as one built by beavers, computer technology is as natural as collecting fruit from the rainforest. There is no other nature to get back to. This is it—we are already there. This frees us to examine all human practices and cultural phenomena without prejudice. It enables us to consider their ecological value without assuming from the outset that some are "naturally" better than others.

Second, we need to be aware of the fundamental character of culture and therefore of cultural variation. It is not just a matter of different symbols with similar meanings, different ways of expressing the same things. Cultures can differ radically in the way they allocate power within the universe, the way they perceive or conceptualize time, the way they define humanity and the relationship between life and death. The acceptability of environmentalist arguments can depend on these variations. The concept of extinction is likely to be very differently received by those for whom cross-species reincarnation is an indisputable fact, than it is by western scientists. The idea of protecting the environment makes little sense to people who see it as their protector.

Third, and following from the previous point, we need to appreciate the way in which the different components of cultural perspectives are related to one another: how fundamental assumptions about the world relate to values, goals, norms and so on. These relationships again affect the extent to which environmentalist arguments can be accommodated. People's receptiveness to the idea of environmental protection depends on the relationship between their understanding of power, the way they allocate responsibility, both within human society and between human and non-human forces, the way they think about time and the extent to which they envisage and plan

for the future. These relationships also affect the extent to which cultural phenomena can be imported from one context into another. It might seem like a good idea for industrial societies to emulate the Dogon respect for trees, for instance. But this is not an isolated phenomenon; it is part of a cultural complex whose other components do not fit easily into an industrial context.

A great deal of knowledge which could provide environmentalists with a better understanding of human ecology is already present in the anthropological literature, though not always in a form that is accessible to non-anthropologists. One way of making this knowledge more available is for anthropologists to participate more fully in environmental discourse (cf. Rayner 1989). But moves can also be made by environmentalists. Efforts to introduce new conservation measures, to formulate new environmental policies and to change damaging practices are usually preceded by research to determine the nature of the problems and identify possible solutions. The arguments presented in this book are intended to communicate the message that problems and solutions are as much cultural as they are physical or biological, and that cultural research should be a part of the package.

Cultural Analysis and Global Discourse

The same principles and methods that are used to compare cultures and cultural perspectives, and to reveal their underlying assumptions and fundamental commitments, are also relevant for understanding what I have called "transcultural" discourses and perspectives, those generated by communication across cultural boundaries. Environmentalist discourse is clearly transcultural in this sense, as are the dominant perspectives that compete and overlap within it. The analysis is inconclusive on the question of which transcultural perspective, globalist or anti-globalist, anthropocentric or ecocentric, holds out the best prospect for an environmentally sustainable future. This is inevitable, since this kind of judgement depends on knowing what such a future might be, and this knowledge cannot come from anthropology alone. Again, this is why we need a mixture of disciplines. But cultural analysis reveals other things that have implications for global environmental discourse.

It reveals, for instance, that the diverse perspectives share a certain amount of common ground, that there is potential for agreement among globalists, anti-globalists and ecocentrists on some practical environmental measures, despite their fundamental disagreements on other things. It reveals that, while both globalists and anti-globalists claim to respect the cultures of non-industrial peoples, they differ in their commitment to this claim. The anti-globalists see this respect as central to the creation of a sustainable future, but in doing so they tie their arguments to a faith in the myth of primitive ecological wisdom, which anthropological knowledge exposes as untenable. The globalists, on the other hand, seek to impose an overarching hegemony which renders more or less worthless their claim to respect cultural diversity, and which reveals their understanding of culture to be particularly naïve and uninformed. It also calls into question their commitment to democratic principles.

Cultural diversity becomes particularly important when viewed in the context of observations made above. If no human culture holds the key to ecological wisdom, then it is essential to conserve the greatest possible number of ways of interacting with the environment if we are to maximize the chances of survival, both of our own species and of those with which we share the planet. To this extent, I agree with the anti-globalist view that protecting cultural diversity might offer the best chance of conserving biodiversity, though I would not accept the argument presented by some anti-globalists, that cultural diversity can guarantee the protection of biodiversity. Neither the anti-globalist nor the globalist perspective has identified the political circumstances in which cultural diversity can be effectively conserved.

That environmentalist arguments can be ill-founded and inconsistent is not itself a surprising revelation. Environmental discourse is essentially political, shaped by vested interests struggling to control the future, and shrouded, therefore, in a great deal of "expressive propaganda". In such contests, it matters more to be convincing than to conform to standards of truth and logic. But cultural analysis can demonstrate in what ways arguments are ill-founded and inconsistent. It can, in Douglas' words, "dispel the fog", by replacing a general cynicism towards, and suspicion of, political debate with a more precise understanding of why we should be unconvinced by some arguments and, perhaps, cautiously receptive to others. If participants in the discourse are willing to listen, then such understanding can only force environmentalist argument on to a franker plane.

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The Benefits of the Commons

F. Berkes, D. Feeny, B. J. McCay, and J. M. Acheson

It has become a truism that resources held in common are vulnerable to overexploitation. Twenty-one years ago, Hardin popularized this dilemma—calling it the "tragedy of the commons"—by the use of a metaphorical village common in which each herdsman "is locked into a system that compels him to increase his herd without limit"[1]. Hardin argued that such problems have no technical solutions, and emphasized the need for government controls to limit "freedom in the commons [which] brings ruin to all"[1]. Hardin and others[2] have subsequently pointed to privatization of common resources as another solution consistent with the analysis of many resource economists.[3]

It is usual to assume that resource degradation is inevitable unless common property is converted into private property or government regulations are instituted. The prevalence of this view is reflected by an article in *The Economist* of 10 December 1988 about fisheries, typically viewed as a common-property resource: "… it is possible to manage fisheries successfully", the author asserts, "provided three facts are kept in mind". Two of these are relevant here: "left to their own devices, fishermen will overexploit stocks" and "to avoid disaster, managers must have effective hegemony over them".

Nevertheless, research carried out in the 21 years since Hardin's article often leads to conclusions that challenge this conventional wisdom. Such results are of interest to resource managers, applied natural and social scientists, policy-makers, and development planners. Many case studies, including our own, show that success can be achieved in ways other than privatization or government control[4–7]. Communities dependent on common-property resources have adopted various institutional arrangements to manage those resources, with varying degrees of success in achieving sustainable use. We use ecological sustainability[8] as a rough index of management success without necessarily implying resource use that is ecologically or economically optimal.

As a first step in the analysis, it is necessary to define the kind of resources under consideration. Common-property (or common-pool[9]) resources share two key characteristics. First, these are resources for which exclusion (or control of access) of potential users is problematic. The physical nature of the resource is such that controlling

the access of potential users is costly and, in some cases, virtually impossible. Migratory or fugitive resources such as fish and wildlife pose obvious difficulties. Similarly, ground water, range and forest lands, and global commons[8] such as the high seas, the atmosphere, and the geosynchronous orbit, pose problems of exclusion.

The second key characteristic of common-property resources is subtractability; each user is capable of subtracting from the welfare of others. This characteristic creates a potential divergence between individual and collective economic rationality in joint use[3]. As one user continues to pump water from an aquifer, others experience increased pumping costs; as the number of fishing boats increases, the catch per unit of effort for each declines. On the basis of these two characteristics, we define common-property resources as a class of resources for which exclusion is difficult and joint use involves subtractability.

As a second step in the analysis, a taxonomy of property-rights regimes is needed[9–11]. Common-property resources are held in one of four basic property-rights regimes. (1) Open access is the absence of well-defined property rights. Access is free and open to all, as with ocean fisheries of the past century. This is the regime implied in Hardin's model. (2) Private property refers to the situation in which an individual or corporation has the right to exclude others from using the resource and to regulate its use. (3) Under communal property, the resource is held by an identifiable community of users who can exclude others and regulate use. Some shellfish beds, range lands, forests, irrigation and ground water have been managed as communal property. (4) State property or state governance means that rights to the resource are vested exclusively in government, which controls access and level of exploitation. Examples include crown lands and resources such as fish and wildlife held in public trust. These four categories are ideal, analytical types. In practice, resources are often held in overlapping combinations of these four regimes, and there is variation within each.

We now briefly summarize selected case studies. These studies show the workings of communal-property systems not recognized in Hardin's model, as well as the limitations to the use of state governance in some situations.

Our first case concerns wildlife hunting territories in James Bay, Quebec, in northeastern Canada[12]. Hunters in this subarctic area have traditionally used resources communally, as do many Amerindian groups, and have a rich heritage of customary laws to regulate hunting. Beaver is an important species both for food and, since the start of the fur trade in James Bay in 1670, for commerce.

The Beaver is vulnerable to depletion because colonies are easily spotted. A community-based hunting territory system, with senior hunters and their families acting as stewards of specific territories, at present ensures sustainable use. The beaver resource in James Bay, however, has not always been used sustainably. In the 1920s, a large influx of non-native trappers followed the new railroad into the area to take advantage of high fur prices. Amerindian communities lost control over their territories and all trappers, including natives, contributed to a "tragedy of the commons". Conservation laws were eventually enacted after 1930, when beaver populations were at an all-time low, and outsiders were banned from trapping in James Bay. Amerindian community and family territories were legally recognized and customary laws became enforceable, resulting in productive harvests after about 1950[12]. The experience of the

1920s and 1930s is not unique. Periods of cut-throat rivalry among fur companies had led to non-sustainable use of resources twice before: in the mid-1700s and in 1825–29. Gradually, however, local control was restored and stocks recovered[12].

Our second and third cases deal with lobster and fish management on the east coast of the United States[13,14] and show that communal territories exist even in societies that subscribe to the ideal of freedom in the commons. In the US tradition, marine resources belong to all citizens but are controlled by state governments as a public trust. Privatization of some marine resources such as shellfish beds is feasible but not always socially desirable or politically acceptable[15]. Government management is similarly difficult: limiting the number of licences is considered an infringement of citizens' rights. Even so some groups of users are able to restrict access and manage common-property resources.

The lobster resource is vulnerable to overharvesting, but lobster stocks in Maine have remained sustainable. Although some managers have for decades been predicting a resource collapse, the Maine lobster catch has been remarkably stable since 1947[13]. The state government establishes lobstering regulations but does not limit the number of licences. In practice, however, there is exclusion through a system of traditional fishing rights; to go lobster fishing at all, one has to be accepted by the community. Once accepted, a lobsterman is only allowed to fish in the territory held by that community. Interlopers are usually discouraged by surreptitious violence.

One cannot say if the resource could have been used sustainably in the absence of such locally enforced exclusion and regulation. But we have compared the productivity of exclusively used territories with areas in which claims of adjacent communities overlap. We found that fishermen in the exclusive territories catch significantly more and larger lobsters with less overall effort[13].

The third case, a trawl fishery in the New York Bight region, provides an alternative community-based solution to the commons dilemma[14]. The fishermen who belong to a cooperative specialize in the harvest of whiting. They have ready access to the best whiting grounds in the region, and often dominate the regional whiting market in the winter months.

The cooperative maintains relatively high prices for members through supply management; it limits entry into the local fishery and establishes catch quotas among members. Limited entry is achieved through a closed membership policy and the control of docking space, effectively excluding non-members from access to whiting grounds and markets. Quotas are based on the estimates of what the cooperative can sell to the regional market, and are achieved in ways that reward individual initiative but also discourage 'free-riding'. By contrast with government-imposed regulations, which are considered by fishermen to be inflexible and which in any case are ineffective because they do not address the fundamental problem of access, self-regulation through the cooperative is considered to be both flexible and effective in maintaining sustainable use[14].

Forests in Thailand comprise our fourth case[16]. Traditionally the exploitation of high-value timber was regulated by local governments; the use of low-value timber was essentially unregulated. The rapid commercial exploitation of teak in Thailand in the late nineteenth century led to the nationalization of all forests. State ownership

fails to provide consistent enforcement, but it also serves to deny users the authority to manage local forests. Illegal logging, followed by further land clearing for cultivation, is widespread. Although much of this land is suitable for cultivation, there are few safeguards for conserving environmentally sensitive areas; this results in overall damage to land.

The lack of enforcement of state-forest property rights leading to accelerated degradation is not unique to Thailand. The nationalization of forests in Nepal (1957) and Niger (1935) produced a similar outcome[17]. In Nepal, the situation is being ameliorated by the re-creation of communal management at the local level[18]. Without effective control by government, nationalization has often converted traditional communal property into *de jure* state property but *de facto* open-access.

Having reviewed a few cases, we return to the tragedy of the commons model to explore its problems in relation to the findings. Hardin asks the reader to assume a pasture "open to all". Each herdsman acts in an individually rational fashion by adding animals to the common pasture. For him, the private benefits of adding one more animal exceed the private cost. Because each herdsman does the same, the overall result is overgrazing and disastrous losses for all.

Hardin's model provides insight about the divergence between individual and collective rationality. But it fails to take into account the self-regulating capabilities of users. It assumes that the herdsmen are unable to limit access or institute rules to regulate use. Therefore, overexploitation is inevitable—unless privatization or government controls are imposed. These conclusions have been used as part of the justification for nationalization[18], privatization of land resources[19], and the widespread practice of top-down development planning that ignores local institutions[4,6]. The social and ecological costs of these practices have often been tragic in their own right.

Recognition that users have the potential and, under some conditions, the motives and means to act collectively opens up other policy alternatives and provides questions about why some communal management systems fail and others succeed. The success or failure of common-property resource management has to do with the exclusion and regulation of joint use. Forest destruction in Thailand, for example, occurs because villagers do not own the forest and cannot exclude others. Local people therefore have little incentive to conserve and every incentive to cut down trees before someone else does[16].

By contrast, in other examples—hunters in James Bay, lobstermen in Maine, trawlermen in the New York Bight area, communal forest users in Nepal, and irrigation water users in South India[20]—groups are able to exclude other potential users and regulate their own joint use. They are therefore able to reap the benefits of their own restraint. Our examples are not isolated, but are consistent with a large body of literature on grazing lands[21], forests[22], water[23], and coastal marine resources[24], covering a wide range of regions and cultures throughout the world.

What accounts for the many exceptions to the predictions of the conventional theory? How can Hardin's model be improved to obtain a more comprehensive theory of common-property resource management? First, the Hardin model confuses common-property resources with open access—the absence of property rights. By equating common-property resources with open access, and then assuming that open

access leads to overexploitation, the model falls into the trap of equating the commons with overexploitation.

Second, the model assumes that the individual interest is unconstrained by existing institutional arrangements. In many communities, common-property resource users are compelled by social pressure to conform to carefully prescribed and enforced rules of conduct.

Third, the model assumes that resource users cannot cooperate toward their common interests. This is not necessarily so; under certain circumstances, voluntary collective action is feasible[25], and sustainable outcomes are not unusual[4–7, 20–24].

More fundamentally, the model overlooks the role of institutions that provide for exclusion and regulation of use. Cultural and historical factors underlying such institutional arrangements are a key to the success of communal management of coastal marine resources in Japan and several Pacific-island nations[24], in addition to the cases we describe above.

Finally, the set of solutions offered by the model is too limited. Privatization or the imposition of government control are not the only viable policy options. In fact, the conventional reliance on these approaches is overly sanguine. By definition, common-property resources are ones for which exclusion is difficult and so privatization is often not feasible. Although dividing a commons and assigning individual property rights can increase efficiency under some circumstances, it might not in others. Similarly, state control has worked in some cases, but the example of Thailand forests illustrates its potential for failure.

In general, we propose that successful approaches to the commons dilemma are found in complementary and compatible relationships between the resource, the technology for its exploitation, the property-rights regime, and the larger set of institutional arrangements. We also propose that combinations of property-rights regimes may in many cases work better than any single regime. The success of local-level management, for example, often depends on its legitimization by central government; James Bay[12] and recent experience in Nepal[18] are examples. Such nested relationships are also found in fisheries in Japan and Oceania[24]. In some cases, cooperative management arrangements (co-management) are needed, involving the sharing of power between governments and local communities[26].

In sum, sustainable common-property resource management is not intrinsically associated with any particular property-rights regime. Successes and failures are found in private, state and communal-property systems. Recent research highlights the potential viability and continued relevance of communal-property regimes, nested systems and co-management. Studies after that of Hardin have shown the dangers of trying to explain resource use in complex socio-ecological systems with simple deterministic models.

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Indigenous Initiatives and Petroleum Politics in the Ecuadorian Amazon

Suzana Sawyer

"We don't want 'la compañía' to dirty our rivers, destroy our forests and divide our people. We oppose the so-called petroleum 'development' that has poisoned communities to the north and demand recognition as indigenous nationalities, as a people whose ancestral territory is one."
—Marta Gualinga. Quichua female leader speaking at the Villano Assembly, December 16, 1993

Along with 250 other lowland Indians, Marta Gualinga trekked through the rainforest for three days before reaching Villano—the site of ARCO's exploratory wells. Lowland Quichua representing 133 indigenous communities throughout Ecuador's central Amazonian province of Pastaza gathered for an assembly called by OPIP (Organization of Indigenous Peoples of Pastaza). For three days in mid-December 1993 participants debated oil exploration and imminent production in Indian lands. Young men with starkly painted torsos and faces angrily denounced ARCO; more experienced leaders cautiously measured alternatives. Petroleum "development" had indelibly transformed the northern Ecuadorian Amazon where scant industrial restrictions over the past 25 years caused significant social and environmental degradation. As hydrocarbon operations moved south, OPIP-affiliated communities weighed how best to prevent similar effects in their lands.

The Villano Assembly launched OPIP's "Campaña Tungui"—invoking the drum rhythm which called allied groups to war centuries ago. The campaign outlined the conditions under which ARCO might proceed with its activities in Indian lands and declared a 15-year moratorium on further petroleum activity in the province. OPIP pressed for indigenous participation in environmental and social planning and monitoring, as well as the economic benefits of ARCO oil operations. Héctor Villamil, OPIP's president, rallied under the corrugated tin roof of a one-room school, "this

assembly affirms our democratic zeal, for participation is precisely what we demand. We denounce current petroleum politics and insist that ARCO respect the territories of the indigenous peoples of Pastaza." A helicopter transporting drilling mud to ARCO's well flew over head.

In a pattern repeated wherever oil operates in Ecuador, the local community was divided. A handful of families loyal to OPIP invited Assembly participants to Villano. Yet a larger group materially supported by ARCO vehemently criticized the assembly and threatened participants. Indigenous opposition introduced risk to continued hydrocarbon activity. Tensions rose as OPIP leaders obstinately asserted their rights to convene in the area and overly zealous young men boasted of occupying ARCO wells, now militarized with seventy counter-insurgency troops. Villano encapsulated the political-economic reality animating petroleum development throughout the Oriente: state dependency on oil, unmitigated military protection, multinational carte blanche, and local factionalism. Despite the power of corporate economic interests and indigenous peoples' circumscribed structural position, however, the Villano Assembly spurred into motion a process which ultimately conditioned—for the first time in Ecuador's seventy-year history of oil exploration—serious dialogue between indigenous peoples and a multinational over petroleum activity in Indian lands. OPIP leadership and community members began to re-articulate the relations between multinationals and local communities and influence the particular pattern of resource extraction in their territory.

The Crude Challenge

In 1967, Ecuador launched itself into the industrial world with Texaco's discovery of a sizable oil reserve in the northern Oriente (as the Ecuadorian Amazon is called). Rainforest lands, previously seen as "empty," "barren" and awaiting colonization, became the source of Ecuador's black gold and the key to national modernization. In 1973, under the newly established military regime. Ecuador joined OPEC, and petroleum became a national security concern. With the influx of new petro-dollars and swollen aspirations to develop the country, the small Andean state became woefully dependent on petroleum. Today, oil revenues account for 50% of the national budget. All major petroleum reserves reside in the Oriente; transformations have been most acute in the northern lowland provinces of Napo and Sucumbios. There the exploitation of large oil fields has inscribed rainforest landscapes with seismic grids, over three hundred productive wells, more than six hundred open waste pits, numerous pumping stations, an oil refinery and the bare-bones infrastructure essential for petroleum operations. A network of roads links oil towns and parallels the pipeline for 500 km across the Andes to the Pacific. For the most part, oil companies have bought off local communities to facilitate the smooth flowing of their operations.

The negative repercussions of petroleum exploration and extraction are slowly becoming documented. In her comprehensive study of Texaco's 25 years of operation, Judith Kimerling calculates that since production began in 1972, Ecuador's trans-Andean pipeline has spilled an estimated 16.8 million gallons of crude—one and a

half times that spilled by the Exxon Valdez. Likewise, petroleum operations discharge 4.3 million gallons of toxic waste daily. Recent studies document an increase in skin and intestinal disease, headaches and fevers among local inhabitants, and contaminants in drinking water which reached levels 1,000 times the safety standards recommended by the U.S. EPA. Despite public protest by Indians, colonists and environmental activists, President Sixto Durán Ballén initiated a formidable campaign to expand production. In 1992, Ecuador withdrew from OPEC in order to produce in excess of the cartel's quotas. All signs indicate that hydrocarbon activity will only intensify.

Consolidating the Commons

Pastaza Province stretches from the central Andes eastward to the Peruvian border, covering 30,000 sq. km. Along the western-most portion, a 30 km-wide plateau flanks the foothills. Here, thirty years of colonization has transformed once forested indigenous land into a patchwork of pasture and agriculture. A network of roads connects smaller hamlets and colonist parcels to the provincial capitol, Puyo. Down the escarpment bordering the plateau's eastern rim, indigenous claimed territory begins—two million hectares of dense, yet managed, rainforest. The terrain is rugged, cut through with numerous river basins by the more than four meters of annual rainfall. Except for one 8km dirt road completed in 1993, there are no vehicular routes into the region. The indigenous populations living in the area inhabit dispersed settlements; the larger built around missions, schools and health dispensaries. Agriculture is largely subsistence with increasing production and harvest for market. This scenario markedly differs from the social and political-economic reality of the provinces directly to the north.

OPIP officially formed in 1978 as state pressure to colonize and develop Pastaza led to greater indigenous displacement. The Indian federation denounced state modernization strategies as destructive of cultural and ecological systems. Gaining communal title to Indian territory was the first step in asserting control over the processes negatively affecting indigenous livelihoods. Through the 1980s, OPIP actions halted colonization at the plateau and curtailed further incursions onto indigenous lands. It was not until 1992, however, when 2,000 Pastaza Indians marched to Quito demanding communal land rights, that indigenous peoples acquired legal title to over one million hectares of their territory. "The March" gained unprecedented popular support throughout Ecuador and signaled a sophisticated indigenous politics of resource use and territorial control. Significantly, it further crystallized the formation of an ethnic-national identity in the region, where livelihood forest management practices inform visions of resource use and social justice in the rainforest.

Yet, while land title precluded the further colonization of Indian lands, it provided no legal control over petroleum activities within them. Indians gained surface rights. Subterranean resources, of which petroleum is the most coveted, belong to the state which retains the right to develop them as it deems necessary. In 1988, ARCO acquired rights to explore an oil concession located in eventually adjudicated Quichua territory in Pastaza. In 1989, Quichua actions paralyzed ARCO exploration for one year. OPIP communities opposed to hydrocarbon activity charged that dynamite detonated

during seismic exploration destroyed agriculture, scared away animals and killed fish. Operations resumed in 1990, however, allowing ARCO to identify pro-oil communities in the interim. In 1992, the company publicly announced its discovery of the province's first productive oil field. As it became increasingly evident that OPIP could not stop oil operations in Pastaza, the federation focused on how best to influence its development.

From OPIP's perspective, all attempts to negotiate with ARCO had decisively failed, despite moments of promise. ARCO refused to recognize OPIP as the legitimate representative body of indigenous inhabitants of the region. Instead, the multinational recognized and materially supported the pro-oil indigenous group that claimed to represent the three communities near the Villano wells. OPIP leaders interpreted ARCO's choice to legitimate a local "organization" newly formed in the summer of 1993 as an affront to their integrity and fifteen-year struggle to consolidate an indigenous politic. ARCO argued that the company felt compelled to support the communities closest to and most directly impacted by their operations. Yet, multinational representatives dismissed the fact that their presence spurred the emergence and continued existence of an anti-OPIP entity; corporate operations both facilitated and profited from dividing indigenous loyalties.

Beyond launching the Campaña Tungui, the Villano Assembly sought to demonstrate through practice how indigenous people envision their territory. Importantly, Indians spoke of *territorio* ("territory") or *tierras* ("lands"—in plural). This terminology reflects an understanding of landscape and property distinct from that of the state, where *tierra* ("land") refers to a commoditized, individualized, alienable object. *Territorio* ("territory"), by contrast, refers to ancestral space, the site of historically belonging within a lived landscape. More than simply connoting the physical contours of a region, *territorio* encompasses moral-cosmological and political-economic complexes which shape social relations with it. Forest management and resource use regimes reciprocally sustain these relations. Indigenous territory "belongs" to no one individual, as with free hold, who independently controls it. Rather, territory belongs to everyone; decision over processes affecting multiple inhabitants would have to be debated by all. Consequently, Indians espousing OPIP politics had just as much right to determine what was to occur in their lands as individuals who supported ARCO's presence in Villano. "The people near the oil wells do not own this land," explained Leonardo Viteri, the director of Amazanga (OPIP's research institute), during debate at Villano. "Nor does petroleum simply affect one community. ARCO's [concession] is 200,000 hectares; we all manage this land and will all be affected by oil." While concerns of those living near oil wells might take special consideration, proximity in and of itself granted no special rights. According to OPIP, a group of pro-production individuals lacked the authority to decide the future of petroleum activity in Indian lands. OPIP-affiliated communities gather in Villano to demonstrate that point.

Cultivating Coalitions

Yet, dialogue between a multinational oil company and an Indian federation grew out of a broader trajectory of strategic coalition building between indigenous and

environmental groups. In 1990, Acción Ecológica (Ecuador's most consistently programmatic environmental group) launched its "Amazon for Life" campaign, a watch-dog effort to denounce, document and redress the environmentally and socially degrading effects of oil development in the northern Oriente. Over the following years, Acción Ecológica and indigenous groups coordinated specific target actions with key support from U.S. and European environmental and human rights groups (especially Oxfam America and the Rainforest Action Network). Through an elaborate transnational network, Indian federations and Acción Ecológica heightened national and international scrutiny of multinationals operations in Ecuador. Momentum snowballed in November 1993, when indigenous and non-indigenous inhabitants of the northern Oriente filed a $1.5 billion class-action lawsuit against Texaco in U.S. federal courts. Plaintiffs charged that the company's deliberate use of substandard technology to maximize profit in Ecuador over 25 years resulted in the massive contamination of the northern Oriente. Given the money involved and the press received, the suit and popular actions have alerted foreign companies that ignoring indigenous and ecological concerns has consequences.

One month after the Villano Assembly, OPIP members in coordination with CONAIE (Confederation of Indigenous Nationalities of Ecuador), CONFENIAE (Confederation of Indigenous Nationalities of the Ecuadorian Amazon) and Acción Ecológica occupied the Quito offices of the Minister of Energy and Mines. Their action fell on January 24th, 1994, the day the Ecuadorian government opened bidding for nine new oil concessions in the Oriente; four of the nine were located in Pastaza. Fifteen individuals positioned themselves inside the Ministerial quarters, refusing passage until the Minister agreed to discuss their concerns. Outside, approximately 150 protesters formed a human chain, impeding all traffic in and out of the building. In the city park across the way, demonstrators pitched tents and strung protest banners, symbolizing their resoluteness. As Luis Macas, the president of CONAIE, asserted, the occupation was in protest of the state's "incoherent petroleum policy" which "is contemptuous of indigenous peoples and provokes social, cultural and environmental conflicts." Protesters' politics were encapsulated in the broad green letters of a banner suspended between trees: "The Defense of Nature and Social Justice are Inseparable."

After a five-hour stand-off, the Minister met with protesters. Despite threats, the police were never called; keen on attracting foreign investors, the government did not wish to call attention to popular protest. Among the five demands presented to the Minister was the need for transparent and direct negotiations between ARCO and OPIP. The following morning, the Minister personally oversaw a meeting between ARCO and OPIP, clarifying the multinational's responsibility to engage in dialogue with the federation. While short of a Ministerial mandate, this meeting led haltingly to the eventual formation of a fragile, tripartite commission in September 1994 to design and monitor petroleum development in the Pastaza. Significantly, the commission includes representatives of an indigenous front of OPIP and anti-OPIP/pro-production groups, ARCO and the state petroleum company. Important changes from the prior pattern of oil exploitation discussed include: no road construction into indigenous territory; directional drilling allowing for multiple wells to radiate off one perforation; and containment of industrial chemicals, muds and solvents. Final

outcomes of dialogues to mitigate negative social and cultural consequences of oil work are still pending.

Dialogue is still in its early stages. To date, ARCO and the state have not finalized details for the construction of a pipeline carrying crude to Pacific ports. Until that point, the company reasons it is unable to make future commitment with indigenous groups. ARCO has agreed, however, to finance an environmental impact study of the exploratory phase of their work. While a standard procedure in the U.S., an environmental impact study of their operations to date is not legally required under Ecuadorian law. This step is significant, theoretically, as an evaluation of the social impact of ARCO operations must accompany analysis of environmental effects. Yet more significantly, OPIP succeeded in insisting that their communal lands be treated as indivisible territory; all Indians, not simply a small group near ARCO wells, must debate oil operations. Dialogue represents the recognition of the commons—the fact that local resource-use and access regimes differently structure decision-making processes over activity within a landscape. While an incomplete and unpredictable process. OPIP's struggle against environmental injustice and for participatory engagement is slowly controlling the processes affecting indigenous livelihood and territory, setting precedence in Ecuador and for the Amazon region.

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Endangered Forest, Endangered People
Environmentalist Representations of Indigenous Knowledge

J. Peter Brosius

> Dawat took a deep breath and came wondrously alive. His eyes and arms almost danced as he made an impassioned plea for his forest and his people. For nearly an hour the power of the forest spoke through him, and when he ended there was an abrupt silence. For a few moments all of us sat quietly as the jungle sounds of distant birds and drumming cicadas filled the air. Although the details of what he said came only several months later when the interview was translated, we all sensed in our hearts that we had heard something both poetic and profound. (Henley, 1990, p. 94)[1]

Introduction

In the early 1980s, timber companies in the Malaysian state of Sarawak, on the island of Borneo, began moving into interior upland areas inhabited by various groups of Penan hunter-gatherers. In 1987, the Penan began to actively resist these incursions by establishing a series of blockades. Since that time the Penan have become the focus of a broad-based international environmental campaign to assert their land rights and preserve the Sarawak rainforest. This campaign has been very high profile indeed, covered widely in the media, and supported by numerous political figures and celebrities.[2] Environmental organizations in the U.S., Canada, Japan, Australia, England, Germany, Switzerland, Austria, Sweden, Denmark, the Netherlands, Belgium, and elsewhere have been involved in various aspects of the Sarawak campaign. What is perhaps most remarkable about this campaign is that it is not the product of central coordination, but instead developed almost spontaneously as the situation of the Penan became more widely publicized.[3] In a series of interviews I conducted with European and American environmentalists, Penan resistance to logging was repeatedly

cited as an exemplar of how indigenous peoples can assert control over their own destinies and, in the process, halt the loss of global biodiversity. In short, the Penan have become icons of resistance for environmentalists worldwide.[4]

In the present discussion I consider the rhetoric of this campaign. In particular, I examine the ways in which Western environmentalists have constructed Penan land rights with reference to Penan knowledge of the landscape and of the biotic elements which exist there. Further, I consider how environmentalists have drawn on ethnographic accounts in the process of constructing or describing certain domains of indigenous knowledge, and how those accounts are transformed in the process of generating images deployed in the campaign. I focus on one text in particular, a book entitled *Penan: Voice for the Borneo Rainforest* by ethnobotanist Wade Davis and environmental activist Thom Henley (Davis and Henley, 1990b).[5] Through focusing on the work of Davis and Henley, and to a lesser extent on other works by Davis (Davis, 1992, 1993), this discussion applies to environmental and indigenous rights rhetoric more broadly: the Penan case is but one instance of a more general discourse.[6]

The Penan, Blockades and the Growth of the International Campaign

The Penan of Sarawak are divided into two distinct populations, the Eastern and Western Penan (Needham, 1972, p. 177).[7] The Eastern Penan comprise all those groups living to the north and east of the Baram river, as well as in the upper Limbang watershed. The Western Penan include all those in the Belaga District, as well as communities in the Silat River watershed and at Leng Beku. Though in broad outline the forest adaptations of Eastern and Western Penan are similar, there are significant differences between these two groups with regard to subsistence technology, settlement patterns, social organization, and in the tenor of social relationships (see Brosius, 1990, 1991a, 1992, 1993a; Needham, 1972). Western Penan communities are characterized by long-term stability and a strong sense of internal cohesion. Eastern Penan bands, on the other hand, are much more fluid with respect to composition and much more ephemeral with respect to long-term historical identity. Western Penan communities tend to be much larger than those of Eastern Penan, with 60 to 200 members.[8] Eastern Penan communities average only 20–40 members. Western Penan bands occupy much larger foraging areas than do Eastern Penan, on the order of 1500 km^2, as opposed to 400 km^2 for Eastern Penan. Both Eastern and Western Penan conceive of their territories as a shared corporate estate over which all members of a community have rights.

Logging has a dramatic effect on the lives of Penan, both nomadic and settled.[9] The most immediate effect is on the forest resources upon which they depend for subsistence and trade. Sago palms (*Eugeissona utilis*) are uprooted by bulldozers, fruit trees are felled and rattan destroyed, and severe river siltation occurs. It is this situation and the blockades that have resulted from it that have attracted worldwide media attention.

Almost without exception, all the communities that have resisted logging with blockades have been Eastern Penan. Western Penan, by comparison, have been

conspicuously acquiescent to the activities of logging companies. The reasons for this contrast are complex and derive from a mix of political, historical, and social factors. One such factor has been that the Baram and Limbang Districts—those areas occupied by Eastern Penan—have been visited by numerous Malaysian and Western environmental activists.

This began in 1982 when the Malaysian environmental organization *Sahabat Alam Malaysia* (SAM, *Friends of the Earth Malaysia*) set up a field office in the upriver town of Marudi. Then, in 1984, Swiss artist Bruno Manser took up residence with a group of nomadic Eastern Penan in the upper Tutoh River area. He remained among various nomadic groups for over 6 years. It is Manser, along with *Sahabat Alam Malaysia*, who is most responsible for bringing the situation of the Penan to world attention. Beginning in 1985, Manser began sending letters out to a range of environmental organizations, and it was not long before reporters, filmmakers and environmentalists began to seek him out in the forest. As Manser was making their situation known outside of Sarawak, he was simultaneously acting as an instrument of encouragement for the normally retiring Eastern Penan to resist. Manser traveled widely throughout the Baram and Limbang areas and arranged large meetings which were attended by representatives from numerous communities. Along with SAM, Manser provided Penan the opportunity to internationalize their cause.

It was after striking images of the Penan blockades began to circulate in 1987 that the Penan began to become more well-known and a concerted international campaign began to be waged, both by Manser and by SAM.[10] The first Penan blockades were established not long after the founding of the Rainforest Action Network, which highlighted the plight of the Penan in its earliest campaigns. Numerous other rainforest groups were also forming in Europe, the United Kingdom, Australia, and Japan, in response to a more general awareness of the scale of tropical deforestation.[11] The Penan became iconic of forest destruction for many of these organizations.

Associated with the acceleration of the international Sarawak campaign were efforts by numerous individual environmentalists to visit Eastern Penan in order to gain first-hand information on their situation and document it for international distribution. A number of Western environmentalists managed to sneak into what had become a closed security zone. In their visits to Penan communities, these individuals frequently told Penan of efforts made on their behalf in Europe, Australia, and the U.S. Their mere presence (and in many cases it was indeed merely a presence, since Penan describe numerous visits by persons with whom they were unable to communicate) confirmed for the Penan the legitimacy of their cause.

Davis and Henley were two such visitors. Henley traveled to Sarawak twice in 1989 in order to visit Penan. It was on his second visit that he was joined by Davis. Davis and Henley stayed with both settled Eastern Penan living in the vicinity of Long Bangan, Long Iman, and Batu Bungan, as well as with nomadic Penan in the Ubung River. During this visit, Davis collected information on medicinal plants, and it was his wish to conduct further ethnobotanical research. This proved impossible because of the tense political situation in the area. In early 1993, Davis traveled to Sarawak again with a screenwriter from Warner Brothers in conjunction with plans to produce a film telling the story of Bruno Manser. On the basis of these brief trips, Davis and

Henley published a series of items on the Penan (Davis, 1992, 1993; Davis and Henley, 1990b). In each of these accounts there is a considerable degree of textual overlap.[12]

The Representation of Penan Knowledge: Resource Management, Landscape, and Medicinal Plants

In examining environmentalist discourse on the significance of indigenous knowledge it is necessary to consider precisely what is meant by the word *knowledge* itself. In fact, we can identify two rather distinct conceptions of indigenous knowledge: one which we might term the objectivist conception, and one the environmentalist conception.

As it is used by ethnoecologists, the word *knowledge* is generally applied to discussions of indigenous understandings of the natural world: systems of classification, how various societies cognize or interpret natural processes, what such groups know about the resources they exploit, and so forth. Brush has suggested that the forms that the study of indigenous knowledge has taken have changed considerably, and that four distinct, historically-situated approaches can be discerned: descriptive historical particularism, cultural ecology, cognitive anthropology, and human ecology (Brush, 1993, p. 658). Each of these presupposes a different set of starting assumptions regarding the nature of indigenous knowledge, and the purposes and epistemological bases for studying it. Central to the latter two approaches in particular has been a concern with the structural or systemic nature of indigenous knowledge (ibid, p. 658) and its utilitarian or adaptive significance (ibid, p. 659). Such is the objectivist notion of knowledge.

Brush also describes how, after 1980, addition of the word "indigenous" produced a more politicized discourse concerned with the issue of rights, and which has culminated in contemporary controversies over indigenous intellectual property rights (ibid, pp. 659–660).[13] Politicized though it was (and is), the discourse of indigenous intellectual property rights has adhered strongly to the objectivist conception of knowledge. This is necessary given the goal of defining indigenous knowledge as an entity subject to statutory recognition and framed with reference to metropolitan forms of legal textualization.

In certain other forms of environmentalist discourse, on the other hand, *knowledge* is transformed into something quite different. My purpose here is to focus on the nature of that transformation by examining what it is that writers such as Davis and Henley have defined and represented to their audience as "indigenous knowledge."

In order to understand how this transformation occurs, it is necessary first to recognize the sources from which such representations of indigenous knowledge emerge. For the most part, they derive from two sources. First, environmentalist representations of indigenous people and the landscapes they inhabit are often based on travel to those areas by activists, generally for periods of weeks or months. Such individuals often lack knowledge of local languages and are thus not able to communicate effectively with indigenous peoples. They are nevertheless able to document current conditions and, perhaps with the help of a translator, to record local perceptions and concerns and collect accounts of abuses by government authorities.[14] Second,

environmentalists frequently draw upon available ethnographic information in order to enrich their accounts and lend them an aura of authority. In point of fact, environmentalist texts seem very often to result from a combination of personal and ethnographic accounts, producing a textual interweaving of personal travel narrative and ethnographic minutiae. This is the strategy employed by Davis and Henley.

Such texts and images, once produced, are dispatched. The course they may take thereafter is quite variable: they may go through numerous transformations as they are repeatedly produced, reproduced, and at last distributed to a larger audience through networks such as the Internet and Econet, through faxes, through documentaries picked up by television networks, by fundraising letters, and in books such as that by Davis and Henley.[15]

These are not texts or images produced for mere aesthetic appreciation. They are deployed to make an argument and mobilize support, and intended to empower those they represent. They are, in short, tools of persuasion: they may be asking us to write letters, to send money, or to provide some other form of support. In order to serve as such tools of persuasion, they must *present* the Penan (or the Kayapo, or the Asmat) in ways that make us care and want to do something. They must also connect them to that other thing that is endangered: the forest.

There are any number of ways to achieve these ends. Arguments have been made about the value of the rainforest in terms of global warming, the preservation of biodiversity, and the potential for discovering new medicines. This is still evolving: new arguments continually emerge. Perhaps the most prevalent argument, and the one in which the most direct linkage is made between the fate of forests and peoples, is to assert the importance of indigenous knowledge for preserving biodiversity and to raise the specter of its loss. According to activist Alan Durning, indigenous peoples:

> … possess, in their ecological knowledge, an asset of incalculable value: a map to the biological diversity of the earth on which all life depends. Encoded in indigenous languages, customs, and practices may be as much understanding of nature as is stored in the libraries of modern science. (Durning, 1992, p. 7)

A second strategy is to link indigenous knowledge to the sacred or ineffable, partaking of a semantic shift that transforms "knowledge" into wisdom, spiritual insight, or some other such quality. This sort of shift is evident in a 1991 *Time* magazine cover story entitled "Lost Tribes, Lost Knowledge" (Linden, 1991). The subtitle of this story is "When native cultures disappear, so does a trove of scientific and medical wisdom." According to Linden:

> The prevailing attitude has been that Western science … has little to learn from tribal knowledge. The developed world's disastrous mismanagement of the environment has somewhat humbled this arrogance, however, and some scientists are beginning to recognize that the world is losing an enormous amount of basic research as indigenous peoples lose their culture and traditions. Scientists may someday be struggling to reconstruct this body of wisdom to secure the developed world's future. (ibid, p. 48)

Both of these valorizing strategies—one linking indigenous knowledge to the preservation of biodiversity, the other transforming "knowledge" into "wisdom"—require

the deployment of a discourse that places indigenous knowledge at its center. It is the latter transformation in particular that I examine here.

In the following discussion, I provide several examples of the transformation that occurs as ethnographic texts are transformed into environmentalist texts, and how in the process the substantive properties of indigenous knowledge are also transformed. In doing so, I focus on three examples: (1) Penan resource management, particularly as it applies to the *molong* concept, (2) knowledge of the landscape, and (3) the rhetoric of medicinal plants. I focus on these topics because, except in the case of medicinal plants, I myself first documented much of this and published it in a number of articles (Brosius, 1986, 1988, 1990, 1991a,b). This material was subsequently picked up and elaborated on by environmentalists, Davis and Henley among them, and incorporated into campaign materials. With respect to the case of medicinal plants, I provide this example because it illustrates the kind of rhetorical traffic that occurs when indigenous peoples themselves adopt and deploy transnational environmental rhetoric.

Resource Management and the *Molong* Concept

Sago, derived from the palm species *Eugeissona utilis*, is the carbohydrate staple of both Eastern and Western Penan. The factor which more than any other determines the nature of their distinctive settlement systems—the location of camps and the frequency and distance of movement—is the availability of sago. Penan have a clear idea of the relative abundance and location of sago groves throughout their foraging areas and locate themselves in proximity to sago concentrations. Rather than simply harvesting *Eugeissona*, Penan exploit it in a manner which maintains its long-term availability.

I first described the principles underlying Western Penan resource use in a 1986 article in the *Sarawak Museum Journal* entitled *River, Forest and Mountain: The Penan Gang Landscape* (Brosius, 1986). When I first wrote about these principles, in particular the *molong* concept, they had not yet been described. My primary purpose in writing this article—at a time when an increasing number of Penan communities were being dispossessed by the activities of logging companies—was to demonstrate that they did not wander aimlessly through the forest as was supposed by so many government authorities, but rather had well-established principles of land tenure and a sophisticated system of resource management. I deliberately published this article in a local journal so that it would be available to civil servants and government officials in Sarawak.

In this article, I described Penan conceptions of landscape, particularly with respect to the role that rivers play in organizing landscape knowledge. I also described the significance of trees, and it was in this context that I first described the *molong* concept:

> … the Penan landscape is filled with particular trees which are either the property of the whole community or which are recognized as belonging to specific individuals. Of significance here is the concept of *molong*, to preserve.[16] This generally applies to fruit trees of various types, to sago clumps, or, for instance, to large trees which are suitable for boat building. Frequently when traveling in the forest a person will spot a tree which has

not been claimed, and will then mark it in some manner, thus reserving it for future harvest or use. In the case of fruit trees, whether they are *molong* by an individual or by the community is dependent on the particular species. … Even young children actively claim trees, and by adulthood may have accumulated several dozen fruit trees and sago clumps. Significantly, there are a large number of trees … which are specifically named. … Many of these trees are recognized as having been *molong* by long-dead ancestors and are thus a further source of continuity between past generations and the present. (Brosius, 1986, pp. 175–176)[17]

Having defined the *molong* concept, I then proceeded to describe the process of sago production, contextualizing this with reference to the reproductive ecology of *Eugeissona*. I described how *Eugeissona* reproduces both by seeds and vegetatively and concluded that:

… while the processing of sago in a particular area over a period of several months may lead to temporary depletion, this harvesting strategy does not negatively affect its long-term growth. It appears likely that the thinning of *Eugeissona* in the process of exploitation may actually enhance the production of starch and viable seed. … This is not to say that *Eugeissona* cannot be over-harvested and thus depleted. Indeed it can, particularly when the harvesting cycle in a particular sago stand is too short and clumps are not allowed to sufficiently recover before being re-harvested. For this reason the Penan are concerned to maintain a sound harvesting strategy which avoids a foreshortened harvest cycle. When the sago in one area has been depleted, it is left to recover over a period of years. The Penan attitude with regard to *Eugeissona* resources is one of explicit stewardship. (Brosius, 1986, p. 177)

Finally, I discussed the implications of Penan resource use for development policy. My purpose in doing so was to demonstrate "the inadequacy of the notion of the Penan as a people without a sense of place, existing in an anonymous landscape" (ibid, p. 179). I noted that "a sense of stewardship constantly informs the manner in which they exploit their environment" (ibid, p. 179), and ended with the statement that "the Penan are conscientious resource managers, fully aware of sustained-yield principles. They exploit their environment in a way that preserves its long-term ecological integrity" (ibid, p. 182). Given the intent of the article (which also contained a number of specific policy recommendations and suggestions for principles upon which Penan land claims might be legally encoded), I felt it was important to make a clear case for the validity of Penan principles of resource management. Whatever the shortcomings of this article, the information provided is firmly grounded in field research, and constitutes an accurate description of Penan landscape knowledge and principles of resource use. Let us now turn to the way that this description has been transformed in the process of Davis and Henley's (re)presentation.

In each of Davis' individual essays (Davis, 1990, 1992, 1993), and in the essay co-authored by Davis and Henley (Davis and Henley, 1990a), the issue of Penan resource management is addressed. In one essay, referring generally to the significance of Penan botanical knowledge, Davis states that "For the Penan all of these plants are sacred, possessed by souls and born of the same earth that gave birth to the people" (Davis, 1990, pp. 98–99). In reference to the usage of *Eugeissona*, Davis and Henley state that:

If there is a pattern to the Penan migration, it is determined by the sacred growth cycle of the sago palm. It is a journey that may take twenty years to complete, an itinerary first described by the ancestors at a time when the earth was young and still wet with the innocence of birth. (1990a, p. 106)

Broadening this description to general principles of resource use, they suggest that:

Their biological adaptation, together with their spiritual beliefs, demand that they exploit the forest in a sustainable manner. Central to their worldview is a sacred obligation to bequeath to the following generations a healthy forest fully capable of providing life to its human inhabitants. (ibid, p. 107)

Finally, Davis and Henley provide a rather embellished description of the *molong* concept:

This Penan notion of stewardship is encapsulated in *molong*, a concept that defines both a conservation ethic and a notion of resource ownership. To *molong* a sago palm is to harvest the trunk with care, insuring that the tree will sucker up from the roots. *Molong* is climbing a tree to gather fruit, rather than cutting it down, harvesting only the largest fronds of the rattan, leaving the smaller shoots so that they may reach proper size in another year. Whenever the Penan *molong* a fruit tree, they place an identifying sign on it, a wooden marker or a cut of a machete. It is a notice of effective ownership and a public statement that the natural product is to be preserved for harvesting at a later time. In this way, through time, the Penan have allocated specific resources—a clump of sago, fruit trees, dart poison trees, rattan stands, fishing sites, medicinal plants—to individual kin groups. The Penan acknowledge these as familial rights that pass down through the generations. In many cases the identifying mark on a particular tree takes the form of two parallel sticks—a sign that acknowledges ownership while inviting the wayfarer to share at the proper time in the bounty of the resource. It is the equivalent of a private property sign that reads "please share wisely" rather than "no trespassing." (ibid, p. 114)

Close examination of the preceding statements reveals a number of inaccuracies: the fact that Davis and Henley do not acknowledge the distinction between Eastern and Western Penan, that they infer a system of direct inheritance, and that they include such things as fishing sites and medicinal plants in their discussion of the *molong* concept. More disconcerting, however, is an apparent need to embellish their description with reference to a form of ecological etherealism that is derived entirely from the Western romantic tradition and has little relation to any set of ideas that would be recognizable to Penan.

Concepts of Landscape

The same characteristics present in Davis and Henley's description of resource management are also evident in the way they describe Penan concepts of landscape. Again this is derived largely from material published by this author. In my 1986 article, I described something of the depth of Penan knowledge of the landscape: the richness of vocabulary for talking about landforms and rivers, the way in which rivers form the skeleton around which environmental knowledge is organized, and how river names incorporate geographical, ecological, historical, and genealogical information.

My intent was to demonstrate how Penan encode ecological information in the naming of landscape features, and to demonstrate the coherence existing between the physical landscape, history, genealogy, and the identities of individuals and communities. I described Penan landscape knowledge as follows:

> A conspicuous feature of the Penan environment is rivers. … The importance of rivers to the Penan can scarcely be underestimated. In an environment where visibility seldom exceeds 200 ft, these rivers and streams form the skeleton around which environmental knowledge is organized. … When traveling in the forest, Penan are always cognizant of their precise location relative to various rivers. This keen sense of spatial relationships derives from an awareness of the relative size of rivers, the angle of flow of one river to another, the topography between particular rivers, the proximity of headwaters of different rivers, and other sorts of environmental cues. … To Penan however, the landscape is more than simply a vast, complex network of rivers. Above all it is a reservoir of detailed ecological knowledge and a repository for the memory of past events. (Brosius, 1986, pp. 174–175)

I then proceeded to describe how rivers are named—for persons, for landscape features, for ecological features, or for particular events—and how, in turn, the deceased are spoken of with reference to rivers. I also described the significance of such naming practices in establishing the "cultural density" of the landscape:

> … the landscape itself serves as an idiom of the maintenance of historical and genealogical information. This idiom is more than a trivial mode of expressing nostalgia. … It is an important mnemonic device for the maintenance of social relationships. … At the same time it serves to establish the rights of Penan communities to exploit the resources of a given area. The rivers in which the ancestors are buried are the source of livelihood for their living descendants. (ibid, p. 175)

This discussion of the nature of Penan knowledge of the landscape is altogether transformed by Davis and Henley. Davis states that "For the Penan this forest is alive, pulsing, responsive in a thousand ways to their physical needs and their spiritual readiness" (Davis, 1990, p. 98). Trees are "blessed with spirits, the animals imbued with magical powers" (ibid, p. 99). Discussing the Penan's skill as "naturalists," Davis suggests that it exists because they identify "both psychologically and cosmologically with the rainforest" (ibid, p. 99). Further, "for Penan, every forest sound is an element of a language of the spirit" (ibid, p. 99). Davis states that:

> To walk in God's forest is to tread through an earthly paradise where there is no separation between the sacred and the profane, the material and the immaterial, the natural and the supernatural. (ibid, p. 99)

Davis and Henley maintain that "Fearful of the heat of the sun, ignorant of the seas, insulated from the heavens by the branches of the canopy, their entire cognitive and spiritual world became based on the forest" (Davis and Henley, 1990a, p. 106). Finally, in a more recent work, Davis asserts that:

> The Penan view the forest as an intricate, living network. Imposed from their imagination and experience is a geography of the spirit that delineates time-honored territories

and ancient routes that resonate with the place names of rivers and mountains, caves, boulders, and trees. (Davis, 1993, p. 25)

What we observe in the statements above is a strategy by which a pattern of recognizing landscape and encoding knowledge about that landscape is transformed into an obscurantist, essentializing discourse which in fact elides the substantive features of that knowledge. The implications of this will be considered in the discussion to follow.

The Rhetoric of Medicinal Plants

A central element of environmentalist rhetoric on rainforest preservation concerns the value of such forests for the potential medicines they might provide Western science, and the importance of indigenous knowledge as a key to the discovery of those medicines. In the film *The Penan: A Disappearing Civilization in Borneo,*[18] the narrator provides the following commentary:

> The greatest reason for protecting this rainforest is perhaps found in the Penan's knowledge of forest products with medicinal purposes. The stem of a certain leaf cures stomach pains, the inner bark of a tree reduces headache and fever within seconds of being applied to one's forehead. When asked if there are any plants nearby that are good for medicine, the Penan will reach for a dozen or more where they stand and explain their use.
>
> With more than 40,000 years of experimentation and observation, the Penan have enormous medical knowledge which Western scientists cannot duplicate. Today less than one percent of the world's tropical forest plants have been tested for pharmaceutical properties. Yet 25% of all our medicine comes from the rainforest. Three-quarters of all anti-cancer drugs are rainforest derivatives. As hundreds of thousands of acres of Sarawak's primary forests are succumbing to chainsaws, the world is coming to realize that this is the tragedy affecting us all.

Though in these cases referring to the Penan, such statements are common in contemporary rainforest conservation rhetoric more generally.

Given his background in ethnobotany and ethnopharmacology, Davis was particularly interested in documenting Penan knowledge of medicinal plants. On his first visit to Sarawak, Davis devoted considerable attention to collecting medicinal plants and to talking with Penan about their uses. According to Davis and Henley:

> Preliminary ethnobotanical surveys suggest that the Penan employ over fifty medicinal plants which they harvest from the primary forest. … The first challenge in assessing the potential of other Penan pharmacopoeia entails understanding the belief system that mediates their use of medicinal plants. (Davis and Henley, 1990a, p. 117)

Davis and Henley then proceed to expand on what they mean by "belief system":

> In general indigenous medicine is based on a thoroughly non-western conception of the etiology of disease in which health is defined as a coherent state of equilibrium between the physical and spiritual components of the individual. Health is wholeness, which in turn is perceived as something holy. … (ibid, p. 117)

They proceed to discuss a melange of Penan/indigenous theories of disease and, in so doing, again make a plea for the preservation of Penan medicinal knowledge:

> With a spirit world that is alive, the Penan quest for healing and well being is rooted both in magico-religious belief and a perspicacious knowledge of pharmacologically active plants. Understanding their folk medicine and identifying those of their plants that may ultimately serve the needs of all human societies is a complex and time consuming task. Unfortunately, as in the case of indigenous societies throughout the world, the traditional knowledge is being lost at a tremendous rate. Logging activities are destroying the source of the medicines even as the forces of acculturation disrupt the integrity of the belief system itself. (ibid, p. 118)

Finally, referring to the complaints of one Penan featured in their 1990 book about the ineffectiveness of medicines provided by the government, Davis and Henley state, "What Dawat is saying is that a synthetic drug cannot replace the spirit of the plants, imbued as they are with the power to heal" (ibid, p. 118).

One of the more interesting consequences of the environmentalist rhetoric of medicinal plants—evident in the preceding quote—is that this rhetoric has itself suffused back to the Penan and been adopted by them as their own. When one visits Penan today, in those areas where blockades have occurred, one of the consequences of forest destruction they most commonly decry is the loss of medicinal plants. As my data collection among Eastern Penan in blockade areas proceeded, I was struck by the frequency with which I heard such statements. In 3 years with Western Penan in the 1980s—in a non-blockade area, and in a mostly pre-blockade era—I rarely heard medicinal plants mentioned or discussed in any context. Certainly Western Penan knew of several, but these tended to be few and to be used for a very broad range of illnesses. I encountered none of the nonstop commentary on the value of traditional medicinal plants that is so evident today when one walks through the forest with Eastern Penan. When I first began working among Western Penan, I fully expected that I would hear much more on this subject. In 1980, I conducted fieldwork among Pinatubo Atya in the Philippines, who have an enormous knowledge of medicinal plants (Fox, 1952) and who constantly pointed them out. What struck me about Western Penan in the 1980s is that they showed so little interest in medicinal plants. In the 1990s, Western Penan in the Belaga District still did not, yet Eastern Penan in the Baram District—that is, in those areas visited by environmentalists—did so with remarkable consistency.[19]

Davis and Henley are not alone in stressing the richness of Penan knowledge of medicinal plants. Other environmentalists writing about the Penan also frequently mention this. Part of the reason for this is that they are told about such plants by Penan. I believe that what we are observing here is what might be termed the "Plotkinization" of the discourse of indigenous knowledge of medicinal plants. Mark Plotkin, of course, has been a leading figure in developing an awareness of the depth of ethnobotanical knowledge of medicinal plants among indigenous peoples in Amazonia.[20] This awareness has diffused into the rhetoric of rainforest conservation in many ways: it has now become standard practice to describe the depth of knowledge of medicinal plants of particular rainforest societies. Such knowledge may exist in

other indigenous societies, but it is much less significant among Penan than recent statements would lead one to expect. This is a kind of ethnographic hall of mirrors; drawing on rhetorics derived from an Amazonian context, environmentalists have brought assumptions derived from a familiarity with Plotkin's work to the Penan, who then repeat it back to other environmentalists, who take it as an exemplar of the depth of indigenous knowledge. Precisely how this has occurred is nearly impossible to reconstruct, but it would seem that it occurs in the myriad conversations that have occurred between Penan and the environmentalists who have visited them. Penan take note of the Western gaze on medicinal plants and turn it back to them as commentary.

Discussion

Drawing mostly on the writings of Davis and Henley as an exemplar of a more general phenomenon, I have attempted to show in one ethnographic context how indigenous "knowledge" is represented and transformed. It has not been my goal to simply provide a particularistic critique of how one group of people have been portrayed and to describe what Penan are "really" like. Nor is this discussion intended as a critique of Western representations of the "other." That would hardly be very original. Rather, this case raises several fundamental questions about how objective conceptions of knowledge are appropriated and deployed in environmental campaigns, and what the consequences of this might be.

There are, in fact, several ways in which the objectivist conception of knowledge has been transformed in the texts I have provided. I have focused on one in particular in the first two cases discussed above: how indigenous "knowledge" is linked to the sacred or ineffable. As noted, it is transformed into wisdom, spiritual insight, or some other such quality. This transformation serves a certain purpose. In describing peoples such as the Penan, the problem for environmentalists and indigenous rights activists is twofold. First, how does one make a society narratable? That is, what must one do to be able to talk about it? However one defines indigenous knowledge, it is not easily accessible. It is not something that can be picked up in a few short weeks, particularly for individuals lacking linguistic competence. The problem for environmentalists is how, nevertheless, to create texts about peoples such as the Penan, and how to talk about the knowledge which they hold to be so valuable without actually comprehending much about that knowledge. Second, how does one create value? Environmentalist and indigenous rights campaigns are generally concerned with peoples who are "endangered" precisely because they, their institutions, and their systems of land-tenure are disvalued by national governments. The Malaysian government considers the Penan a national embarrassment, a people who represent precisely those things they are trying to overcome in their national development efforts. The goal of environmentalists then is axiological: to demonstrate both to the government and to Western audiences what is at stake if the forest, and the Penan, are destroyed.

By reducing Penan knowledge to the sacred or ineffable, the Penan are made both narratable and valuable. In linking knowledge to the sacred, commentators acquire a

way to construct meta-commentaries about the *meaning* of a body of knowledge, rather than about that knowledge itself. The danger, of course, is that such meanings may only be interpolated and may, in fact, be Western in origin.

In short, the discourse of the sacred serves to make Penan narratable, all the while serving to elide gaps in understanding. At the same time it also imbues them with value: a value that authors themselves feel in a most profound way, but cannot otherwise articulate. It makes land, resources, and people inviolable, and it does this by appealing to preexisting categories of value: the endangered, the last whisper of an ancient past. As David Suzuki said of one Penan, "Listen to Dawat. He is what we once were" (Suzuki, 1990, p. 8).

The meta-commentary on the sacred or ineffable has a number of pernicious effects. The most obvious is that it imposes meanings on Penan "knowledge" that may be quite imaginary. In imposing some meanings, it expunges others. Penan certainly have some sense of the ineffable, and this is expressed in a range of concepts relating to power, avoidance, respect, and so forth (see Brosius, 1992, 1995, 1995–96). But it is nothing like the obscurantist sanctity Davis and Henley describe. Reducing the ineffable to "sacred" transforms and distorts it.

Second, it paradoxically makes generic precisely the diversity that it is trying to advance. Whatever else sanctity is, it is not a universal category. In presenting Penan knowledge as wisdom or insight having a sacred quality, one is imposing a falsely universalized quality on a range of peoples, and thereby collapsing precisely the diversity that defines them. The Penan are transformed into a homogenous "indigenous people," or "forest people." This is a very common—and often quite explicit—element in contemporary commentaries on indigenous rights. For instance, Durning states that "Amid the endless variety of indigenous belief, there is striking unity on the sacredness of ecological systems" (Durning, 1992, pp. 28–29). According to Native American activist Winona LaDuke:

> Traditional ecological knowledge is the culturally and spiritually based way in which indigenous peoples relate to their ecosystems. This knowledge is founded on spiritual-cultural instructions from "time immemorial" and on generations of careful observation within an ecosystem of continuous residence. (LaDuke, 1994, p. 127)

Suzuki and Knudtson describe "this ancient, culturally diverse aboriginal consensus on the ecological order and the integrity of nature [which] might justifiably be described as a 'sacred ecology' …" (Suzuki and Knudtson, 1992, p. 18). Barreiro asserts that:

> Indigenous cultures are rich in ecological concept. "Our Mother the Earth" is a reality in the cosmologies of virtually every native people in the world. … It is one of the currents of thought that make up Pan-Indigenous philosophy and a basic message of the Indian peoples. (Barreiro, 1991, p. 200)

And Wade Davis describes the Penan as "Related in spirit to the Mbuti pygmies of Zaire and the wandering Maku of the Amazon" (Davis, 1993, p. 24).

The discourse of medicinal plants is something else again. I do not mean to suggest that Eastern Penan lack knowledge of medicinal plants. Rather, what is significant is the way in which Penan presently emphasize and elaborate on this domain of knowledge

as a central element of their objections to logging, a product of environmentalist involvement with Penan. Indigenous knowledge of medicinal plants forms a highly narratable domain and invests environmentalist statements about the Penan with an aura of authority. As such, it becomes a locus around which environmentalists and Penan can converse. One might argue that those domains of indigenous knowledge that are most accessible in this manner are elevated to a particularly important status in the discourse of endangered knowledge.

In the preceding discussion, I have attempted to show how, in an effort to make a people narratable and to create value (all the while essentializing them as "forest people"), environmentalist discourse about indigenous knowledge has the potential to transform that knowledge into something it is not. To save something, or to mobilize an audience to want to save something, requires that it be made beautiful or profound, or have some transcendent value. In creating that value, however, the thing itself is transformed. Thus the rich, if generally mundane, Penan knowledge of the forest landscape by being transformed into something that is sacred, valued, and thus to be saved, is constructed in terms of categories that are Western in origin. We see here a hall of mirrors of representation—simulacra—as Penan knowledge is transformed into something that it is not, and Western discourses are transported to Penan, who again convey them to Western interlocutors. The essential—and diverse—qualities of indigenous knowledge are lost along the way. As the future of the forests, other biomes, and indigenous peoples is negotiated in the years ahead in a plethora of post-Rio international fora, the issue of who talks for whom and who constructs representations of whom is critical.

NOTES

1. I translated this interview in 1989 for the Davis and Henley volume for which Dawat Lupung, the individual interviewed, was awarded the Reebok Human Rights Award.

2. In the U.S., for example, the issue of logging in Sarawak has been covered in *Newsweek, Time, The New Yorker, The Wall Street Journal*, and *Rolling Stone*; on National Public Radio, NBC Evening News, CNN, and on the programs *National Geographic Explorer* and *Primetime Live*. Figures as diverse as Al Gore, Jerry Garcia, and Prince Charles have spoken out on behalf of the Penan.

3. In this sense, referring to it as a "campaign" is inaccurate, since this would seem to imply centralized coordination. Certain organizations acted as clearinghouses for information or promoted particular strategies, but no single organization choreographed all the events that have transpired over the matter of logging in Sarawak since the mid-1980s. I refer to it as a campaign only as a matter of convenience. I must also stress that although most environmental organizations have focused their attention on the Penan, many environmentalists have insisted that this not be seen as a Penan issue exclusively. They argue that the concern should be for indigenous rights in Sarawak in general.

4. In the following discussion, reference to *environmentalists* should be understood to refer both to representatives of environmental organizations such as *World Wide Fund for Nature* and *Greenpeace*, as well as to representatives of indigenous rights organizations such as *Survival International* and *Cultural Survival*. Though these two types of organizations have at times been at odds, there has been some movement in recent years toward a convergence of interests.

5. Davis received his PhD in Ethnobotany from Harvard University under the supervision of the prominent ethnobotanist Richard Schultes, and is most well-known as the author of *The Serpent and the Rainbow* (Davis, 1985). In the late 1980s, a controversy developed around Davis' work on Haitian voodoo (see Booth, 1988; Yasumoto and Kao, 1986). Henley, before he became involved in the Sarawak issue, was instrumental in organizing the campaign to protect the Queen Charlotte Islands, one of Canada's most historically significant environmental campaigns. Within the context of the Sarawak campaign, Henley's most active role was in organizing the 1990 *Voices for the Borneo Rainforest World Tour*, a series of events that brought two Penan and one Kelabit activist to Australia, Japan, North America, and Europe—some 18 countries in all. Henley and Davis, along with several other individuals, co-founded the *Endangered Peoples Project*, a foundation "dedicated to the promotion of biological and cultural diversity" (Henley, 1990, p. 93).

6. In discussing how Western environmentalists have represented the Penan, it is not my intention to question the validity of the concerns that motivate those within the environmental movement: I share their concern with ecological degradation and its effects on indigenous peoples. My comments are directed at particular theoretical strategies: not at the broader concerns that underlie them. Furthermore, whatever my misgivings about the forms of rhetoric examined here, I feel it is important to acknowledge the positive contribution that individuals such as Wade Davis and Thom Henley have made in bringing the situation of the Penan to the attention of the public in the U.S. and Europe.

7. Eastern and Western Penan in Sarawak together number some 7000 individuals. The Eastern Penan total some 4500 in approximately 50 communities, while Western Penan total some 2500 in 18 communities. These figures are updated from figures I have provided in previous publications and reflect estimations of population growth since 1987, when I carried out a census of Western Penan. In addition to Eastern and Western Penan, there are also several small groups of Penan who have been settled for a century or more and who have little interaction with either Eastern or Western Penan. These include the Penan Nyivung, Penan Bok, Penan Suai, and Penan Jelalong (for more information on Penan in Sarawak, see Arnold, 1958; Brosius, 1986, 1988, 1990, 1991a,b, 1992, 1993a,b, 1995, 1995–96; Harrisson, 1949; Huehne, 1959; Kedit, 1978, 1982; Langub, 1972a,b, 1974, 1975, 1984, 1988, 1989, 1990; Needham, 1954a,b,c,d, 1965, 1972; Nicolaisen, 1976a,b, 1978; Urquhart, 1951, 1957, 1959).

8. These figures refer to band size prior to settlement. Both Eastern and Western Penan communities tend to experience growth once settlement occurs (see Arnold, 1958; Needham, 1972; Urquhart, 1951).

9. Among both Eastern and Western Penan the trend toward sedentism has accelerated greatly since about 1960. I estimate that in 1960, 70–80% of all Eastern and Western Penan were still nomadic. Of 7000 Eastern and Western Penan today, fewer than 400 Eastern Penan in the vicinity of the Magoh, Tutoh, and upper Limbang River areas remain fully nomadic, approximately 5% of the total. The last nomadic Western Penan settled ca. 1970.

10. In addition to SAM another local NGO, the *Sarawak Indigenous Peoples Alliance* (SIPA), also played a key role in the campaign for a short time. SIPA was forced to disband by the Sarawak government in 1992 after founder Anderson Mutang Urud was arrested.

11. Among the environmental and indigenous rights organizations who have been involved in the Sarawak campaign are *Rainforest Action Network* (U.S.), *Friends of the Earth, Greenpeace, Western Canada Wilderness Committee, Japan Tropical Forest Action Network, Rettet den Regenwald* (Germany), *Robin Wood* (Germany), *Society for Threatened Peoples* (Austria, Germany, Switzerland), *ProRegenwald* (Germany), *Nepenthes* (Denmark), *Global 2000* (Austria), *Bruno Manser Fonds* (Switzerland), and the *Rainforest Information Center* (Australia). Their activities

have ranged from letter-writing campaigns to attempts at tropical timber boycotts, protests at Malaysian embassies, ship blockades in Europe and Australia, and direct actions in Sarawak itself.

12. As this article was under review, I received from Davis a copy of his most recent book on the Penan, co-authored with Ian Mackenzie and Shane Kennedy (Davis, Mackenzie, and Kennedy, 1995). Though it retains some of the romanticized language that appears in previous works by Davis and Henley, in this most recent piece an effort was made to provide a more realistic portrait of the Penan by a more balanced use of ethnographic material and by the inclusion of numerous translated Penan commentaries.

13. See Brush and Stabinsky (1996) for a comprehensive overview of issues involved in establishing a legal basis for the recognition of indigenous intellectual property rights.

14. Bruno Manser is a conspicuous exception here; having lived with Penan for over 6 years, he became a fluent speaker of the Eastern Penan language.

15. The process by which campaigns develop is extremely complex, particularly with respect to the relationship between the initial analysis of a particular context, decisions about how to proceed in a campaign, and the representations that are ultimately produced and deployed. Most environmental and indigenous rights organizations are self-consciously aware of the contrast between the images they purvey and the realities of a given situation, but they must also necessarily provide persuasive images. In any event, it is a mistake to equate the often bold simplicity of campaign images with the processes of analysis and debate that both precede and follow their deployment.

16. Since providing this initial definition "to preserve," I have further clarified the semantic content of the term *molong* (Brosius, 1991a, 1992, 1993a). It conveys the sense of fosterage as well as preservation. The *molong* concept does not constitute ownership of resources: rather, it encompasses a somewhat individuated, proprietary concept of stewardship. Other members of the community may exploit resources which are individually claimed, but they must inform the individual who has claimed that resource. The *molong* system does two things: (1) it serves as a way to monitor information on the availability of resources over vast tracts of land, and (2) it prevents the indiscriminate cutting of fruit trees and sago, resources which might otherwise be seriously depleted. In one sense, the entire Western Penan settlement system may be seen as a temporalized manifestation of the *molong* concept.

17. It should be noted that Eastern Penan do not *molong* resources to the same degree as Western Penan. Eastern Penan do employ the word *molong* (and the synonym *mulah*), but the concept plays a relatively minor role in Eastern Penan notions of resource management, particularly in its individual aspects. This is not to say that Eastern Penan lack any sense of stewardship over the resources in their foraging areas. It is simply that Eastern Penan concepts of resource management are less formalized and individuated than those of Western Penan.

18. Produced by the Endangered People's Project (Mill Valley, CA) and the Congressional Human Rights Foundation (Washington, DC), written by Thom Henley, and released in 1989.

19. I do not mean to imply that the Penan are lacking ethnobotanical knowledge. Indeed, their knowledge of forest plants is considerable. However, this knowledge tends to focus on plants whose utility is rather mundane: fruit trees, trees that are suitable for firewood, varieties of rattan useful for making particular types of items, and the like. It is for this reason that the contemporary Eastern Penan emphasis on the threat to medicinal plants is so remarkable.

20. Like Davis, Plotkin was trained by Richard Schultes. Long before the theme of indigenous knowledge of medicinal plants became an element of rainforest conservation rhetoric, Schultes impressed upon his students the potential importance of studies focusing on this topic among native Amazonians.

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Tribal Whaling Poses New Threat

Will Anderson

There are few symbols as powerful as the sight of a whale in her death throes, thrashing in agony from a whaler's explosive harpoon. Now, despite the efforts of whale advocates, the long and arduous campaign to end the killing of all whales is nearing catastrophe.

The source of this imminent disaster is the 1855 Treaty of Neah Bay (the Treaty) that in Article IV states, "The right of taking fish and of whaling or sealing at usual and accustomed grounds and stations is further secured to said Indians in common with all citizens of the United States." The Makah (who call themselves Ko-ditch-ee-ot, which means People of the Cape) are part of the Nuu-cha-nulth culture that extends north to Vancouver Island, Canada, and were regarded as the best indigenous whalers on the West Coast. Whale hunting was central to the Makah cultural identity. The blubber, bones and by-products from the whales enabled the Makah to prosper. Extensive spiritual rituals, lasting several months, included fasting, sexual abstinence, self-flagellation and prayers. These preparations were considered essential before the select few whalers went to sea. In a tight tribal hierarchy, it was the whaling families who had the greatest power to rule as chiefs. Now, after a 70-year lapse in which the Makah have not whaled, and at a time when there is zero nutritional subsistence need for whales, they wish to reassert their Treaty right to kill gray whales, protected internationally since 1946. Though there is no obvious way in which it could be done legally at the present time, many in the Makah community believe there will be a way to make money from the renewed whaling.

On May 5, 1995, the Makah Tribal Council (MTC) Chair, Hubert Markishtum, wrote to the US government asking it to represent the Makah before the International Whaling Commission (IWC), the international body that passed a 1986 moratorium on commercial whaling. The Makah requested the US Departments of Commerce and State "… to represent the Tribe in seeking International Whaling Commission ("IWC") approval of an annual interim ceremonial and subsistence harvest of up to five (5) gray whales." The letter also stresses, "It should be emphasized, however, that we continue to strongly believe that we have a right under the Treaty of Neah Bay to harvest whales not only for ceremonial and subsistence but also for commercial purposes."

Though the Makah feel that the IWC does not have ultimate authority over their treaty rights, they attended the 1996 IWC meeting in Aberdeen, Scotland, traveling from their ancestral home of Neah Bay located in the extreme northwest corner of Washington State. The US apparently felt obligated, under the Treaty, to represent the Makah at the IWC. What surprised the opponents to whaling was the ferocity of the US delegation, headed by Dr. James Baker, as he proceeded to make the Makah proposal the overriding issue.

Neither Endangered, Nor Safe

On June 16, 1994, at the request of the Northwest Indian Fisheries Commission (NWIFC), the gray whale (*Eschrichtius robustus*) was removed from the endangered species list. It was the Makah, members of NWIFC, who initiated the de-listing. Twice, the 40- to 50-foot gray whale (*Eschrichtius robustus*) has been driven to near extinction by non-native commercial hunters. Gray whales inhabit near-shore coastal waters and therefore are vulnerable to human activity. During the summer, they feed in shallow waters off of North America and Russia and, after making the longest known migration of any mammal (up to 12,500 miles from Mexico to the Bering Sea), return to the warm waters of Mexican lagoons in winter to mate and give birth to the next generation. However, pollution, loss of habitat, increasing boat traffic and pressures caused by a rising human population are threats to the mere 23,000 gray whales living today. Several gray whales are "residents" in Washington State for part of the year, often staying at Neah Bay and Makah Bay, within a harpoon's throw of a Makah whaler.

Over the past few decades, whale behavior has changed in response to the cessation of whaling. Friendly encounters between trusting whales and humans are becoming common.

If renewed whaling occurs, gray whale feeding, mating and resting activities could be easily disturbed because the whales may begin to fear all passing boats, even those with no harmful intent. Once they learn to avoid vessels, the countless interactions between whales and boats will likely result in more flee responses, interruptions in feeding behaviors, disruptions of mother-calf interactions and fewer opportunities for whales to rest.

Global Implications

IWC approval of Makah whaling would have a profound effect on other whales (there are also thirteen tribal Indian bands in Canada and an Alaska Eskimo Whaling Commission that have stated their intent to kill gray whales). Whale protectionists familiar with the IWC know that the biggest beneficiaries of a Makah IWC victory would be the Japanese, Norwegian, and other commercial whalers.

For years, Japan and Norway have supported culturally based Small Type Coastal Whaling as a way to re-enter commercial killing of whales. The Makah have lived 70

years without whale meat, so they cannot argue a need for subsistence, an IWC requirement up to now. If the IWC approves the Makah request on a purely cultural basis, the change in IWC criteria could open the door for the commercial whalers in many smaller towns with a cultural whaling history. That could effectively end the IWC moratorium on the commercial killing of whales.

Save The Whales

The Makah Tribal Council nearly won this year. Were it not for the cooperative efforts of environmental and animal welfare advocates, the Makah could have been whaling as early as this fall. What the US IWC delegation did not count on were several Makah Elders who wrote and signed a half-page letter of opposition that was published (again, with funds from several environmental and animal welfare organizations) in the local Peninsula Daily News.

In the public letter, the Elders stated, "… there is no spiritual training going on. We believe they, the Council, will just shoot the Whale, and we think the word 'subsistence' is the wrong thing to say when our people haven't used or had Whale meat/blubber since the early 1990's." They continue, stating, "For these reasons we believe the hunt is only for the money." Other parts of the letter take issue with the Makah Tribal Council's failure to properly put the whaling proposal to the full tribal membership.

Soon afterwards, two Makah, Alberta Thompson, an elder, and Dottie Chamblin, who has a background in traditional medicine and oral whaling history, volunteered to go to the IWC meeting in Scotland and lobby against their own corporate form of government (disagreements between traditional elders and their formal tribal governments are not uncommon. The Indian Reorganization Act of 1935 forced all US tribes to take on a corporate form of government, replacing the various forms of traditional tribal governments that inherently gave Elders a great influence).

At the IWC meeting, Alberta and Dottie destroyed the legitimacy of the US position and the delegation sent by the corporate Makah Tribal Council. At the same time Republican Jack Metcalf, of Washington State, and Democrat Jack Miller, of California, introduced a resolution condemning the Makah proposal in the House Committee on Resources. The resolution passed unanimously. With phenomenal teamwork by many people lobbying and representing their organizations, the US delegation was forced to withdraw the proposal. The MTC, for its part, has vowed to return next year for one more try, stating they will go whaling regardless of the IWC's next decision. That would make the US government an outlaw pirate whaling nation if it does not enforce the moratorium with the Makah.

Modern Life

Neah Bay, the center of Makah cultural and economic life, is a town emerging from a recession, but retaining modern conveniences and services. A new 7.8 million dollar

marina will open next year. The town boasts a new head start school, a modern K-12 school campus with night-lit athletic fields, Federal Express deliveries, a super market, subsidized bus service to the city of Port Angeles, tennis courts, and, according to MTC meeting minutes, the largest tribal budget ever. Batelle Institute estimates that thousands of jobs will be created with new ventures into aquaculture. Tourism related to natural and cultural attractions has tripled in the past three years.

Neah Bay is not without its problems, but killing whales will not solve them. Efforts to instill cultural identity in their youth faces competition from television and the distractions of modern life. Killing whales is supposed to end the same social ills that plague many cities and towns: drug abuse, crime, and disintigrating families. Like many non-native communities in Washington dependent on timber and fisheries, there have been difficult economic times. Quotas for salmon and timber are a fraction of the previous decade. Seasonally high unemployment creates conditions for substance abuse and places strain on the community. Some housing needs upgrading. The Tribal Council is always looking for more money, and has not denied that somehow whaling will bring additional, substantial revenues. Several tribal members have stated this belief. Whaling opponents do not readily see how this will happen as it appears to be legally impossible for a profit to be made. Whether the Makah believe that commercial whaling will eventually be legal in the US, or that they feel there is a loophole in current law, is unknown. Certainly other tribes in Washington State feel they can legally enter into commercial sealing, since they have stated their intent to do so "as soon as a market is found."

But whaling opponents feel that Makah efforts will not result in a stronger Makah position. Quite the opposite; the social and political firestorm that will erupt if the Makah actually begin killing whales could erode or destroy the Treaty of Neah Bay itself. Public furor in opposition to whaling will translate into political demands that Congress at the least re-negotiate the Treaty so that whales are not killed.

Must We Start Over?

Gray whales are born in Mexico, then live out their long lives internationally. Our understanding and relationship with them has changed drastically since the Treaty was signed in 1855. Not surprisingly, it is the Elders who know how whale protectors feel, and what many of us have experienced in the presence of cetaceans. Whale advocates are still hopeful that the traditional Elders will prevail over the corporate MTC, to the benefit of the tribe and the whales. Meanwhile, non-Makah must instill in Congress the will to resist whaling at all costs. We also must convince the Clinton Administration that whaling is an inhumane, environmentally unsound policy. If we lose this struggle, the whales will feel the agony in oceans around the world.

On the Importance of Being Tribal
Tribal wisdom

David Maybury-Lewis

Tribal people hold endless fascination for us moderns. We imagine them as exotics trapped in a lyrical past, or as charming anachronisms embarking on the inevitable course toward modernity. What few of us realize is that tribal peoples have not tried (and failed) to be like us, but have actually chosen to live differently. It is critical that we examine the roads they took that we did not; only then can we get a clear insight into the choices we ourselves make and the price we pay for them—alienation, loneliness, disintegrating families, ecological destruction, spiritual famishment. Only then can we consider the possibility of modifying some of those choices to enrich our lives.

In studying tribal societies, as I have for 30 years, we learn that there is no single "tribal" way of life—I use the word here as a kind of shorthand to refer to small-scale, preindustrial societies that live in comparative isolation and manage their affairs without a central authority such as the state. But however diverse, such societies do share certain characteristics that make them different from "modern" societies. By studying the dramatic contrasts between these two kinds of societies, we see vividly the consequences of modernization and industrialization. Modernization has changed our thinking about every facet of our lives, from family relationships to spirituality to our importance as individuals. Has ours been the road best traveled?

Strange Relations

The heart of the difference between the modern world and the traditional one is that in traditional societies people are a valuable resource and the interrelations between them are carefully tended; in modern society things are the valuables and people are all too often treated as disposable.

In the modern world we shroud our interdependency in an ideology of independence. We focus on individuals, going it alone in the economic sphere, rather than persons, interconnected in the social sphere. As French anthropologist Marcel Mauss put

it, "It is our Western societies that have recently turned man into an economic animal." What happened?

A truly revolutionary change—a social revolution centering on the rights of the individual—swept Western Europe during the Renaissance and eventually came to dominate and define the modern world. While traditional societies had denounced individualism as anti-social, in Western Europe a belief in the rights and dignity of the individual slowly came to be regarded as the most important aspect of society itself.

The glorification of the individual, this focus on the dignity and rights of the individual, this severing of the obligations to kin and community that support and constrain the individual in traditional societies—all this was the sociological equivalent of splitting the atom. It unleashed the human energy and creativity that enabled people to make extraordinary technical advances and to accumulate undreamed-of wealth.

But we have paid a price for our success. The ever-expanding modern economy is a driven economy, one that survives by creating new needs so that people will consume more. Ideally, under the mechanics of this system, people should have unlimited needs so that the economy can expand forever, and advertising exists to convince them of just that.

The driven economy is accompanied by a restless and driven society. In the United States, for example, the educational system teaches children to be competitive and tries to instill in them the hunger for personal achievement. As adults, the most driven people are rewarded by status. Other human capabilities—for kindness, generosity, patience, tolerance, cooperation, compassion—all the qualities one might wish for in one's family and friends, are literally undervalued: Any job that requires such talents usually has poor pay and low prestige.

The tendency of modern society to isolate the individual is nowhere more clearly evident than in the modern family. In the West we speak of young people growing up, leaving their parents, and "starting a family." To most of the world, including parts of Europe, this notion seems strange. Individuals do not start families, they are born into them and stay in them until death or even beyond. In those societies you cannot leave your family without becoming a social misfit, a person of no account.

When the modern system works, it provides a marvelous release for individual creativity and emotion; when it does not, it causes a lot of personal pain and social stress. It is, characteristically, an optimistic system, hoping for and betting on the best. In contrast, traditional societies have settled for more cautious systems, designed to make life tolerable and to avoid the worst. Americans, in their version of the modern family, are free to be themselves at the risk of ultimate loneliness. In traditional family systems the individual may be suffocated but is never unsupported. Is there a middle way?

Finding that middle way is not a problem that tribal societies have to face, at least not unless they find their way of life overwhelmed by the outside world. They normally get on with the business of bringing up children against a background of consensus about what should be done and how, which means that they can also be more relaxed about who does the bringing up. Children may spend as much time with other adults as they do with their parents, or, as in the Xavante tribe of central Brazil, they may wander around in a flock that is vaguely supervised by whichever adults happen to be nearby. As soon as Xavante babies are old enough to toddle, they attach

themselves to one of the eddies of children that come and go in the village. There they are socialized by their peers. The older kids keep an eye on the younger ones and teach them their place in the pecking order. Of course there are squabbles and scraps, and one often sees a little child who has gotten the worst of it wobbling home and yelling furiously. The child's parents never do what parents in our society often do—go out and remonstrate with the children in an attempt to impose some kind of adult justice (often leaving the children with a burning sense of unfairness). Instead they simply comfort the child and let her return to the fold as soon as her bruised knee or battered ego permits. At the same time, there is never any bullying among the Xavante children who are left to police themselves.

The Xavante system represents an informal dilution of parents' everyday responsibilities. In many societies these responsibilities are formally transferred to other relatives. In the Pacific Islands, for example, it is quite common for children to be raised by their parents' kin. Among the Trobriand Islanders, this is seen as useful for the child, since it expands his or her network of active kin relationships without severing ties to the biological parents. If children are unhappy, they can return to their true parents. If they are contented, they remain with their adoptive parents until adulthood.

Tribal societies also differ from the modern in their approach to raising teenagers. The tribal transition to maturity is made cleanly and is marked with great ceremony. In Western societies families dither over their often resentful young, suggesting that they may be old enough but not yet mature enough, mature enough but not yet secure enough, equivocating and putting adolescents through an obstacle course that keeps being prolonged.

Tribal initiation rites have always held a special interest for outside observers, who have been fascinated by their exotic and especially by their sexual aspects. It is the pain and terror of such initiations that make the deepest impression, and these are most frequently inflicted on boys, who are in the process of being taken out of the women's world and brought into that of the men. Some Australian Aboriginal groups peel the penis like a banana and cut into the flesh beneath the foreskin. Some African groups cut the face and forehead of the initiate in such a way as to leave deep scars.

Circumcision is, of course, the commonest of all initiation procedures. Its effect on the boy is, however, intensified in some places by an elaborate concern with his fortitude during the operation. The Maasai of East Africa, whose *moran* or warriors are world famous as epitomes of courage and bravado, closely watch a boy who is being circumcised for the slightest sign of cowardice. Even an involuntary twitch could make him an object of condemnation and scorn.

Initiation rituals are intended to provoke anxiety. They act out the death and rebirth of the initiate. His old self dies, and while he is in limbo he learns the mysteries of his society—instruction that is enhanced by fear and deprivation and by the atmosphere of awe that his teachers seek to create. In some societies that atmosphere is enhanced by the fact that the teachers are anonymous, masked figures representing the spirits. The lesson is often inscribed unforgettably on his body as well as in his mind. Later (the full cycle of ceremonies may last weeks or even months) he is reborn as an adult, often literally crawling between the legs of his sponsor to be reborn of man into the world of men.

Girls' initiation ceremonies are as dramatically marked in some societies as those of boys. Audrey Richards' account of the *chisungu*, a month-long initiation ceremony among the Bemba of Zambia, describes the complex ritual that does not so much add to the girl's practical knowledge as inculcate certain attitudes—a respect for age, for senior women and men, for the mystical bonds between husband and wife, for what the Bemba believe to be the dangerous potentials of sex, fire, and blood. The initiate learns the secret names of things and the songs and dances known only to women. She is incorporated into the group of women who form her immediate community, since this is a society that traces descent in the female line and a husband moves to his wife's village when they marry. Western writers tend to assume that it is more important for boys to undergo separation from their mothers as they mature than it is for girls. But the Bemba stress that mothers must surrender their daughters in the *chisungu* to the community at large (and to the venerable mistress of ceremonies in particular) as part of a process through which they will eventually gain sons-in-law.

The ceremony Richards observed for the initiation of three girls included 18 separate events, some 40 different pottery models (shaped for the occasion and destroyed immediately afterward), nearly a hundred songs, and numerous wall paintings and dances, all used to instruct the girls in their new status. All of this represents a large investment of time and resources. The initiation gives girls a strong sense of the solidarity and powers of women in a society that also stresses male authority and female submissiveness.

Ever since the influential work of Margaret Mead, there has been a tendency in the West to assume that, if growing up is less stressful in tribal societies, it is because they are less puritanical about sex. The modern world has, however, undergone a sexual revolution since Mead was writing in the 1930s and 1940s, and it does not seem to have made growing up much easier. I think that, in our preoccupation with sex, we miss the point. Take the case of tribal initiations. They not only make it clear to the initiates (and to the world at large) that they are now mature enough to have sex and to have children; the clarity also serves to enable the individual to move with a fair degree of certainty through clearly demarcated stages of life.

A Moral Economy

Since earliest times, the exchange of gifts has been the central mechanism through which human beings relate to one another. The reason is that the essence of a gift is obligation. A person who gives a gift compels the recipient either to make a return gift or to reciprocate in some other way. Obligation affects the givers as well. It is not entirely up to them whether or when to bestow a gift. Even in the modern world, which prides itself on its pragmatism, people are expected to give gifts on certain occasions—at weddings, at childbirth, at Christmas, and so on. People are expected to invite others to receive food and drink in their houses and those so invited are expected to return the favor.

In traditional societies, it is gifts that bond people to one another and make society work. It follows that in such societies a rich person is not somebody who accumulates

wealth in money and goods but rather somebody who has a large network of people beholden to him. Such networks are the instrument through which prominent people can demonstrate their prestige. They are also the safety net that sees an individual through the crises of life.

In modern societies these networks have shrunk, just as the family continues to shrink. There are fewer and fewer people to whom we feel obligated and, more ominously, fewer and fewer who feel obligated to us. When we think of a safety net, when our politicians speak of it, we refer to arrangements made by abstract entities—the state, the corporation, the insurance company, the pension fund—entities we would not dream of giving presents to; entities we hope will provide for us (and fear they will not).

Traditional societies operate a moral economy, that is, an economy permeated by personal and moral considerations. In such a system, exchanges of goods in the "market" are not divorced from the personal relationships between those who exchange. On the contrary, the exchanges define those relationships. People who engage in such transactions select exchange partners who display integrity and reliability so that they can go back to them again and again. Even when cash enters such an economy, it does not automatically transform it. People still look for just prices, not bargain prices, and the system depends on trust and interdependence. In traditional societies the motto is "seller beware," for a person who gouges or shortchanges will become a moral outcast, excluded from social interaction with other people.

An Ecology of Mind

The sense of disconnection so characteristic of modern life affects not only the relations between people but equally importantly the relations between people and their environment. As a result, we may be gradually making the planet uninhabitable. The globe is warming up and is increasingly polluted. We cannot take fresh air or clean water for granted anymore. Even our vast oceans are starting to choke on human garbage. The rain forests are burning. The ozone layer is being depleted at rates that constantly exceed our estimates.

How have we come to this? A hundred years ago science seemed to hold such promising possibilities. But the scientific advances of the 19th century were built on the notion that human beings would master nature and make it produce more easily and plentifully for them. Medieval Christianity also taught that human beings, although they might be sinners, were created in God's image to have dominion over this earth. Whether human dominion was guaranteed by the Bible or by science, the result was the same—the natural world was ours to exploit.

Tribal societies, by contrast, have always had a strong sense of the interconnectedness of things on this earth and beyond. For example, human beings have, for the greater part of the history of our species on this earth, lived by hunting and gathering. Yet peoples who lived by hunting and gathering did not—and do not to this day—consider themselves the lords of creation. On the contrary, they are more likely to believe in (and work hard to maintain) a kind of reciprocity between human beings and the species they are obliged to hunt for food.

The reciprocity between hunter and hunted is elaborately expressed in the ideas of the Makuna Indians of southeastern Colombia. The Makuna believe that human beings, animals, and all of nature are parts of the same One. Their ancestors were fish people who came ashore along the rivers and turned into people. Out of their bodies or by their actions these ancestors created everything in the world, the hills and forests, the animals and the people. They carved out river valleys by pushing their sacred musical instruments in front of them.

People, animals, and fish all share the same spiritual essence and so, the Makuna say, animals and fish live in their own communities, which are just like human communities. They have their chiefs, their shamans, their dance houses, birth houses, and "waking up houses" (places where they originally came into being as species). They have their songs and dances and their material possessions. Above all, animals and fish are just like humans because they wear ritual ornaments, consume spirit foods— coca, snuff, and the hallucinogenic brew called *yage*—and use the sacred *yurupari* instruments in their ceremonies. When shamans blow over coca, snuff, and other spirit foods during human ceremonies, they are offering them to the animal people. When human beings dance in this world, the shaman invites the animal people to dance in theirs. If humans do not dance and shamans do not offer spirit food to the animal people, the animals will die out and there will be no more game left in this world.

Thus when the fish are spawning, they are actually dancing in their birth houses. That is why it is particularly dangerous to eat fish that have been caught at the spawning places, for then one eats a person who is ceremonially painted and in full dance regalia. A human being who does this or enters a fish house by mistake will sicken and die, for his soul will be carried away to the houses of the fish people.

It is clear that Makuna beliefs have specific ecological consequences. The sacredness of salt licks and fish-spawning places, the careful reciprocity between humans and their fellow animals and fish, all mediated by respected shamans, guarantee that the Makuna manage their environment and do not plunder it. The Swedish anthropologist Kaj Arhem, an authority on the Makuna, describes their ecological practices and cosmological speculations as an "ecosophy," where the radical division between nature and culture, humans and animals—so characteristic of Western thought— dissolves.

Arhem suggests that we need an ecosophy of our own, imbued with moral commitment and emotional power, if we are to protect the resources on which we depend and ensure not only our own survival but also that of our fellow creatures on this earth.

We, on the other hand, tend to forget our environment except when we want to extract wealth from it or use it as the backdrop for a scenic expedition. Then we take what we want. There is no compact, none of the reciprocity so characteristic of tribal societies. For the most part we mine the earth and leave it, for we do not feel we belong to it. It belongs to us. This rootlessness and the waste that goes with it are particularly shocking to traditional societies.

The Indians of the western United States were outraged by the way in which the invaders of their territories squandered the resources that they themselves used so sparingly. The Indians on the plains lived off the buffalo, killing only as many as they needed and using every bit of the dead animals. They ate the meat, made tents and

clothes from the hides, and used the bones to make arrow straighteners, bows, mallets, even splints for setting fractures. They made butter from the marrow fat and cords from the sinews. When the white buffalo hunters came, it was more than an invasion. It was a sacrilege. These men slaughtered the herds with their powerful rifles, often taking only the tongue to eat and leaving the rest of the animal to rot.

The deep sadness of the Indians over this slaughter was expressed in a speech attributed to Chief Seattle, after whom the city of Seattle is named, believed to have been delivered in 1854 to an assembly of tribes preparing to sign away their lands under duress to the white man. Some contend the speech was actually written by a Texas speechwriter in 1971. Whatever their origin, these moving words convey an environmental and spiritual ethic that most tribal people share. They speak as much to us about our own predicament as they did to Chief Seattle's fellow chiefs about their defeated civilization. "What is man without the beasts?" he asked. "If all the beasts were gone, man would die from a great loneliness of spirit. For whatever happens to the beasts, soon happens to man. All things are connected. … We know that the white man does not understand our ways. One portion of the land is the same to him as the next, for he is a stranger who comes in the night and takes from the land whatever he needs. The earth is not his brother, but his enemy, and when he has conquered it, he moves on. He leaves his fathers' graves behind, and he does not care. He kidnaps the earth from his children. He does not care. His fathers' graves and his children's birthright are forgotten. He treats his mother, the earth, and his brother, the sky, as things to be bought, plundered, sold like sheep or bright beads. His appetite will devour the earth and leave behind only a desert."

Touching the Timeless

Modern society is intensely secular. Even those who regret this admit it. Social theorists tend to assume that modernization is itself a process of secularization that has not only undermined people's religious beliefs but has also deprived them of their spirituality. In the industrial nations of the West many of the people who believe in God do not expect to come into close contact with the divine, except after death—and some of them are not too sure about it even then.

Indeed, it seems that those who live in the secular and industrialized West are already searching for ways to fill the vacuum in their lives left by "organized" religion and the numbing delights of mass society. We live in a world that prides itself on its modernity yet is hungry for wholeness, hungry for meaning. At the same time it is a world that marginalizes the very impulses that might fill this void. The pilgrimage toward the divine, the openness to knowledge that transcends ordinary experience, the very idea of feeling at one with the universe are impulses we tolerate only at the fringes of our society.

It seems that we denigrate our capacity to dream and so condemn ourselves to live in a disenchanted world. Shorn of the knowledge that we are part of something greater than ourselves, we also lose the sense of responsibility that comes with it. It is this connectedness that tribal societies cherish. Yet for modern society, this is a bond we

cannot bring ourselves to seek. But if we do not listen to other traditions, do not even listen to our inner selves, then what will the future hold for our stunted and over-confident civilization?

The Tightrope of Power

Meanwhile, this civilization of ours, at once so powerful and so insecure, rolls like a juggernaut over societies that have explored the very solutions that might help us save ourselves. We do so in the name of progress, insisting all too often that we offer science, truth, plenty, and social order to peoples who lack these things. Yet the contrast between tribal societies and the centralized states that prey on them is not one of order and disorder, violence and peace. It is instead a contrast between societies in which no one has a monopoly on the legitimate use of force and others in which those rights are vested in a state. The 20th century has been one of the bloodiest in history, not only because of the wars between countries employing weapons of mass destruction but also because modern technology has been used by ruthless rulers to cow their own subjects. Hitler and Stalin are only the most notorious examples of dictators who directed violence against their own people in the name of the state. There are literally scores of shooting wars going on at the moment, most of them between states and their own subjects.

The state guarantees order, or is supposed to. Force, the monopoly of the government, is applied massively but, once the system is in place, relatively invisibly. Its victims are hidden in concentration camps or banished to Siberias. In many places today, the victims simply disappear.

It seems that people will often acquiesce in despotism for fear of anarchy. Recent history seems to indicate that the most advanced countries are more afraid of anarchy than they are of oppression. The Russians, whose whole history is a struggle to create order on the open steppes of Eurasia, have a fear of disorder (which they call *besporyadok*, the condition of not being "lined up") that has frequently led them to accept tyranny. At the other extreme, the United States, whose whole history is a determination to avoid despotism, allows more internal chaos than most other industrial nations. It values individual freedom to the point of allowing private citizens to own arsenals of weapons and puts up with a rate of interpersonal violence that would be considered catastrophic in other countries.

It seems that human beings are everywhere searching for the right balance between the mob and the dictator, between chaos and tyranny, between the individual and society. Industrial societies give a monopoly of power to the state in exchange for a guarantee of peace. We take this social order for granted to the extent that we tend to assume that there is anarchy and perpetual warfare in tribal societies. What we do not realize is that such societies are acutely conscious of the fragility of the social order and of the constant effort needed to maintain it. Paradoxically, the people who live in societies that do not have formal political institutions are more political than those who do since it is up to each individual to make sure that the system works, indeed to ensure that the system continues to exist at all. Tribal people avoid the perils of anarchy only through constant and unremitting effort.

Elijah Harper, an Ojibwa-Cree who is a member of parliament in the Canadian province of Manitoba, contrasted the democratic procedures of the native Canadians he represented with those of the Canadian government that was trying to push through a revision of Canada's constitution. The new constitution was designed to respond to Quebec's demand to be considered a distinct society within Canada, with appropriate protection for its own language and culture. Harper used parliamentary procedure to block the constitutional change, on the grounds that native Canadians had been asking for similar consideration for years without getting a hearing. A new round of discussions concerning the revision of Canada's constitution is now taking place and this time the rights of Canada's "first nations," the aboriginal peoples, are also on the agenda.

The Canadian crisis makes clear what is only dimly perceived in other countries, namely that the destiny of the majority in any state is intimately linked to the fate of its minorities. The failure of the first attempt to change their constitution has forced Canadians to think about what kind of society they want theirs to be. These are the same questions that the Aborigines are trying to put on the Australian agenda and that the Indians are forcing Brazilians to think about as they protest against the rape of Amazonian regions.

It is not only in authoritarian states that questions arise about how people within a state are allowed to go about their business. The dramatic events in Eastern Europe, however, have led some people to think so. Once the heavy hand of Communist dictatorship was lifted, the nations of Eastern Europe started to unravel. Old ethnic loyalties surfaced and ethnic rivalries threaten to dismember one nation after another. The problem in Eastern Europe is not that it is made up of more peoples than states, but rather that the states have not been successful in working out political solutions that could enable those peoples to live together amicably. But neither do democratic regimes find it easy to create more imaginative solutions that allow diverse groups of people to live together.

The reason for this failure is that such solutions require us to have a different idea of the state, a kind of new federalism, which, after the manner of the League of the Iroquois, permits each people in the nation to keep its council fire alight. This requires more than rules; it requires commitment. The Great Law of the Iroquois was remarkable because it was a constitution that had the force of a religion. People were willing, indeed eager, to subscribe to it because they saw it and revered it as the source of peace. Is it too much to hope that in a world riven with ethnic conflict we might search for political solutions more energetically than we have in the past? That we will not continue to expect strong states to iron out ethnicity, even if it means wiping out the "ethnics"? A new federalism is in our own interest, for it offers the hope of peace and the prospect of justice. Nations that trample on the rights of the weak are likely to end up trampling on everybody's rights. As we wring our hands over the fate of tribal peoples in the modern world, we would do well to remember John Donne's words: "Never send to know for whom the bell tolls; it tolls for thee."

Serious consideration of tribal ways of life should lead us to think carefully and critically about our own. What would it take for us to try to live in harmony with nature or to rehumanize our economic systems? How can we mediate between the

individual and the family, between genders and generations? Should we strive for a less fragmented view of physical reality or of our place in the scheme of things? These questions revolve around wholeness and harmony, around tolerance and pluralism. The answers are still emerging, but they too are variations on a grand theme that can be summed up in E.M. Forster's famous phrase: "Only connect." The project for the new millennium will be to re-energize civil society, the space between the state and the individual where those habits of the heart that socialize the individual and humanize the state flourish.

Consumption and Globalization

For a U.S. audience, this final section brings home the personal dimension of environmental choices, because we live in a consumer society. Akhil Gupta discussed the enormous difference between Indian and U.S. consumption patterns in Section 5. In comparison to the average Indian who consumes 2 kg of meat each year, U.S. residents eat 112 kg of meat. Beyond basic food necessities, Americans are preoccupied with having the right car, clothes, home, and electronics. People replace these items with changing fashions, often before they are worn out. These consumption patterns connect Americans to the exploitation of a vast array of the globe's resources (see also Redman in Section 3). For example, in this section, Brewster Kneen discusses some of the business and environmental practices through which Cargill, an agribusiness company, weaves together a global food system.

The article by Wilk connects earlier cultural ecology to the issues of globalization and consumer culture by discussing political ecology. Wilk argues that anthropology needs to consider consumption as the central ecological issue, one that is inherently global. Doing so draws ecological work into territory currently dominated by cultural studies.

How globalized is the world economy? We offer charts listing the dollar value of import and export figures for 13 of the countries profiled in this reader, as well as global trade. The figures cover 5 years during the mid-1990s, when trends toward globalization were purportedly increasing. A comparison of import and export figures will tell students the extent to which any single country is a net exporter or importer of goods. Large exports may not indicate economic growth if a country, in turn, is a heavy consumer of foreign goods. Not all countries fit into global trends in the same way, and we encourage students to debate the varied quality of global connections. This chart serves as this section's polemical piece. Curiously, given the fanfare surrounding globalization, it was difficult to find trustworthy numbers in a standardized currency that suggested the quality of global trade activities beyond raw export data. We settled here for data reported in the Central Intelligence Agency's annual fact book.

As Luke theorized in Section 5, the very concept of "globalization" requires imagining the world as a single entity—a notion not everyone shares. In contributions to this section, the authors take a few approaches to understanding the "globe" as an ecological entity and as a site of personal consumption. Caren Kaplan considers the production of these ideas through the marketing practices of The Body Shop, which link ecological health and personal well-being through marketing. Kaplan's analysis of The

Body Shop's use of travel in its advertising campaigns complements Martha Honey's assessment of ecotourism. Tourism is a multibillion dollar industry, structured to create an immediate experience of foreign cultures and environments. Martha Honey examines the ecological and social foundations of ecotourism in global settings.

Compared to the glamour of world travel, students may be surprised by the environmental prescription offered by Duane Elgin. In his ethical reflection, Elgin offers the radical idea that people could decline to consume. Time spent shopping might be spent on other endeavors, as people build their lives around principles and activities that require far fewer financial and environmental expenditures.

TABLE 1

Value of Imports and Exports 1992–1996 in billions of U.S. dollars

	IMPORTS					EXPORTS:				
	1992	1993	1994	1995	1996	1992	1993	1994	1995	1996
Australia	37.8	37.8*	43	51.1	57.4	41.7	41.7*	44	50.4	51.57
Brazil	21	20	25.7	33.2	49.7	31.6	35	38.8	43.6	46.5
Cameroon	2.1	1.2	1.8	1.96	810m†	1.2	1.8	1.7	1.6	1.2
TB:Ecuador	1.95	2.4	2.5	3	3.7	2.9	3	3	3.3	4
Egypt	11.7	10	10.5	11.2	15.2	4.5	3.6	3.5	3.1	5.4
India	25.2	25.5	22	25.5	33.5	20.2	19.8	21.4	24.4	29.96
Lesotho	604m	805m	964m	964m*	1	59m	57m	109m	109m*	142m
Mexico	36.7	48.1	65.5	79.4	72	27.4	27.5	50.5	60.8	80
Philippines	12.3	14.5	17.1	21.3	26.5	8.7	9.8	11.1	13.4	17.4
Sierra Leone	146m	62m	131m	149m	150m	138m	75m	149m	149m	115m
U.K.	211.9	210.7	221.6	215	221.9	186.4	187.4	190.1	200	200.4
United States	499.4	544.1	582	664	751	428.1	442.3	449	513	578
Zimbabwe	1.6	1.8	1.8	1.8	1.8	1.8	1.5	1.5	1.8	2.2
World††	3.49	3.82	3.82*	4.1	4.4	3.34	3.64	3.64*	4	4.3

* As per original source, denotes replication of information from previous year when new figures were unavailable. All information in this and following figures drawn from the *World Factbook* published annually by the Central Intelligence Agency, Washington, D.C.

† Figures in millions of U.S. dollars denoted with 'm.'

†† Global figures are in trillions of dollars.

FIGURE 1
Imports in billions of U.S. dollars 1992–96
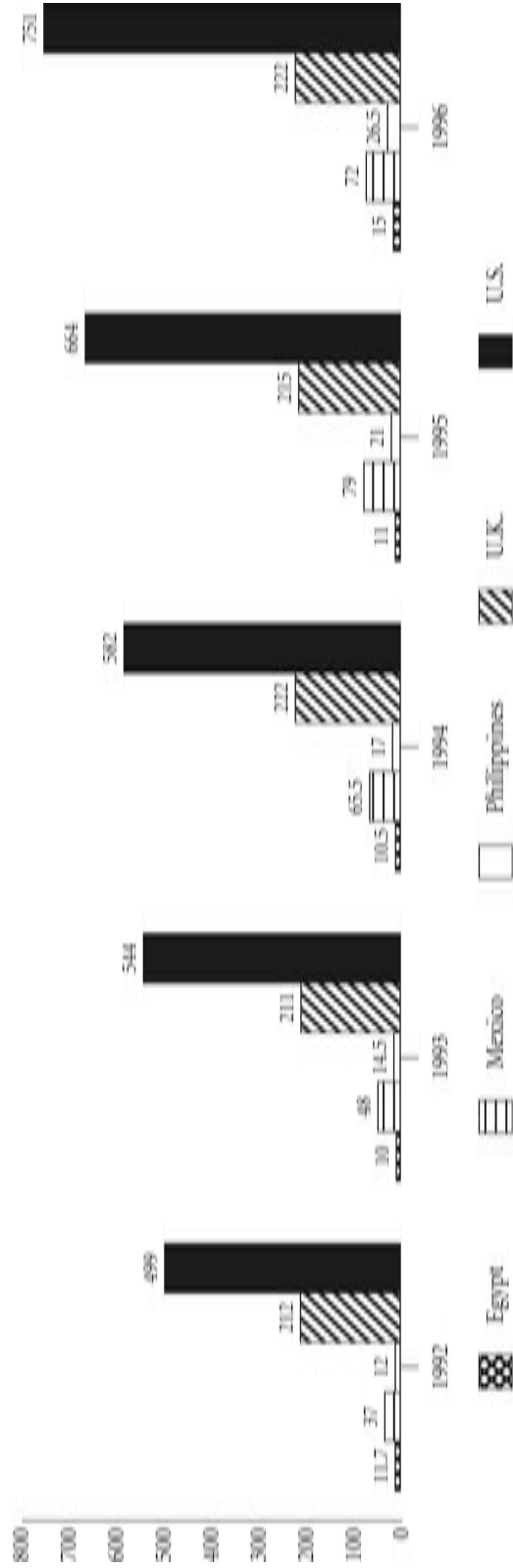
FIGURE 2

Exports in Billions of U.S. Dollars 1992–96
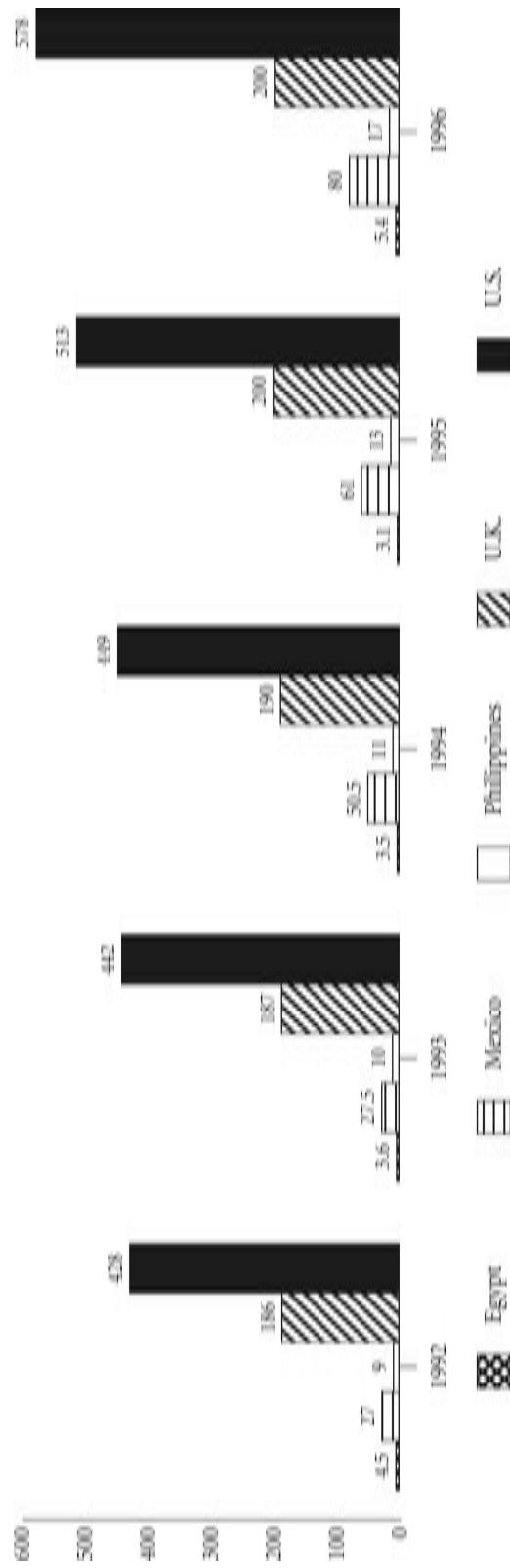
How Do We Know We Have Global Environmental Problems?

Science and the Globalization of Environmental Discourse

Peter J. Taylor and Frederick H. Buttel

Introduction

Since scientists a generation ago detected radioactive strontium in reindeer meat and linked DDT to the non-viability of bird eggs, science has had a central role in shaping what count as environmental problems. Over the last few years, environmental scientists and environmentalists have called attention, in particular, to analyses of carbon dioxide concentrations in polar ice, measurements of upper atmospheric ozone depletion, remote sensing assessments of tropical deforestation, and, most notably, projections of future temperature and precipitation changes drawn from computation-intensive atmospheric circulation models. This current coalition of environmental activism and 'planetary science' has stimulated a rapid rise in awareness and discussion of global environmental problems. A wave of natural and social scientific studies has followed on the effects of global environmental change on vegetation and wildlife, agriculture, world trade and national economic viability, and international security. We know we have global environmental problems because, in short, science documents the existing situation and ever tightens its predictions of future changes. Accordingly, science supplies the knowledge needed to stimulate and guide social-political action.

Science-centered environmentalism is, however, vulnerable to 'deconstruction'. Environmental problems, almost by definition, involve multiple, interacting causes, allowing scientists to question the definitions and procedures of other scientists, promote alternative explanations and cast doubt on the certainty of predictions. In turn, people trying to make or influence policy often find the lack of scientific closure a potent weapon (JASANOFF, 1992). After an initial honeymoon period during the late 1980s, global climate modeling, estimates of biodiversity loss, and other studies of the implications of environmental change have become subject to scientific and consequent political dispute.

The purpose of this paper is not to add our own assessment of the reliability of global environmental science or of the severity of the problems this science is indicating.

Instead, building on the sociology and social studies of science, we propose a different construction of the special relationship between environmental science and politics. The sociology and social study of science has, over the last 15 years, illuminated the social influences that shape what counts as scientific knowledge. Truth or falsity of the science is rarely sufficient to account for its acceptance, either within science or, as will be an equally important concern to us here, within the political realm. In this light we make three propositions, each confounding the first answer above to the question of how we know we have global environmental problems:

(1) In science, certain courses of action are facilitated over others, not just in the use or misuse of science, but in its very formulation—the problems chosen, categories used, relationships investigated, and confirming evidence required. Politics—in the sense of courses of social action pursued or promoted—are not merely stimulated by scientific findings; politics are *woven into* science at its 'upstream' end. In the case of environmental problems, we know they are global in part because scientists and political actors jointly construct them in global terms.

(2) In global environmental discourse, two allied views of politics—the moral and the technocratic—have been privileged. Both views of social action emphasize people's *common* interests in remedial environmental efforts while, at the same time, steering attention away from the difficult politics that result from differentiated social groups and nations having different interests in causing and alleviating environmental problems. We know we have global environmental problems, in part, because we act as if we are a unitary and not a differentiated 'we'.

(3) Global environmental change, simultaneously a scientific framework and a movement ideology, is particularly vulnerable to deconstruction. The point is not that appeals to common or universal interests are without efficacy as a political tactic (as, for example, human rights campaigns in times of severe repression demonstrate). Rather, inattention to the national and localized political and economic dynamics of socio-environmental change will ensure that scientists, both natural and social, and the environmentalists who invoke their findings will be continually surprised by the unpredicted conflicts and unlikely coalitions. To the extent that 'we' attempt to focus on global environmental problems, to stand above the formation of such coalitions and the conduct of such conflicts, 'we' are more likely to be spectators, rather than engaged participants in the shaping of our related, but different futures.

To explore these propositions, we will begin with a reconstruction and overview of the interwoven science and politics of *The Limits to Growth* (LTG) study of the 1970s. This case is convenient not only for reasons of demonstrating historical continuity; there is also a vast literature on the topic and a long span of experience by which to assess its consequences. Although the study should be familiar to most readers, we believe that our interpretation of the LTG is novel. From this beginning we then make extensions to current studies of the human/social impacts of climate change. Finally, we discuss the possible sources of deconstruction of the globalization of environmental discourse, affecting both environmental action and the planetary science upon which it draws.

Global Modeling, 1970s Style

The LTG study was funded by the Club of Rome, an elite group of Western business-men, government leaders, and scientists, and was conducted by system dynamics (SD) modelers at MIT (MEADOWS *et al.*, 1972). The predictions from World 3, an SD model of the world's population, industry and resources were for population and economic collapse unless universal (coordinated, global-level) no-growth or steady-state policies were immediately established.

A major debate developed over the LTG study. Environmentalists applauded the attention the LTG drew to the finiteness of the Earth's resources, and the environmental movement took up notions such as finiteness of resources, 'economic growth vs the environment', growth control, and the steady-state economy as their major ideology and agenda. Economists, however, strongly criticized the LTG's pessimism. Scarcity, signalled in price changes, they contended, would stimulate technological advance and thus push back the limits of available resources. From a different vantage point, many leftists and social-justice-oriented progressives saw the LTG worldview as being insensitive to the needs of the poor and innocent of the realities of the penetration of multinational capital across the world. Others, particularly those skilled in the methodology of systems analysis, pointed to weaknesses in the model's empirical basis, structure and validation.

Despite the initial firestorm of criticism, the system dynamicists never conceded that their modeling was in error (MEADOWS *et al.*, 1973; BLOOMFIELD, 1986). After the heated reaction to the LTG, they adopted a lower profile, but continued to use SD in a wide variety of modeling and educational projects (e.g. FORRESTER, 1976), most notably in the explanation of broad modes of economic behavior—business cycles, inflation, and long waves (Kondratiev cycles). We can understand their continued belief in the validity of SD if we look more closely at construction of the LTG model of the world, noting that, whilst the system dynamicists were 'doing science', they were also constructing interventions in that world. Both the representation of how that world works and the interventions proposed for improving it made each other seem more real.

System dynamics, pioneered by Jay Forrester at MIT in the 1950s, was used first to model individual firms, then to explain urban decay and, by the end of the 1960s, to uncover the dynamics of the whole world. The origin of SD in the modeling of firms has significance for the subsequent applications. Managers with whom Forrester had talked (recall that the LTG model and its predecessor models were developed at the Sloan School of Management at MIT) had observed repeated cycles of running up inventories, then laying off workers, and then once again accumulating a backlog of orders, adding labor and increasing production, only to find themselves overcompensating and running up inventories again. Instead of attributing this cycle to the business cycle, Forrester concluded that the causes were endogenous to the firm. Each decision of management was rational but, when coupled together and incorporating the unavoidable time delays between setting a goal and fulfilling it, the overshoot-undershoot cycle resulted. Given that the undesirable behavior was caused by the interactions among different sectors of the firm, the firm's overall management could

overcome the cycling only if there were a superintending manager in a position to override the decisions of managers in the separate sectors of the firm. For example, the sector managers could be instructed to keep larger inventories and respond more slowly to changes in the backlog of orders than they would otherwise prefer to do.

SD for firms set the pattern for the subsequent urban, global and other SD models. In general, the modeler does not rely solely on recorded data, but instead invokes common-sense knowledge of how individuals work when they face a task with the usual information available. Computer games are often employed to convince players that they would not behave any differently from the people or other entities in the models (STERMAN, 1987). Building on this common-sense validation of the separate decisions, SD then demonstrates that these locally rational decisions, when worked through feedbacks in the system model, generate unanticipated and undesired or pathological, outcomes.

Using decision rules that look plausible to an individual, not only the LTG but al-most all SD models exhibit undesirable cycles or positive-feedback-based exponential growth and collapse. These cycles are difficult to overcome by adjusting the parameter values, even if set as high as economic or technological optimists would like. SD mod-elers infer that this behavior is intrinsic to the structure of the system modeled, not in its detailed specifications. The actions of some individuals *within* the system cannot override the structure, even if those individuals understand the system as a whole. But in the case of the LTG 'world system', unlike in firms, there is no superintending man-ager to enforce the required interrelated changes in or at this world level. Catastrophe is thus inevitable unless 'everyone'—all people, all decision-makers, all nations—can be convinced to act in concert to change the basic structure of population and produc-tion growth. In this fashion SD models support either a moral response—everyone must change to avert catastrophe!—or a technocratic response—only a superintend-ing agency able to analyze the system as a whole can direct the changes needed. There is no paradox here—moral and technocratic responses are alike in attempting to bypass the political terrain in which different groups experience problems differently and act accordingly. Forrester has argued that global questions, such as the 'feasibility' of continued growth of the world's population, capital stock and resource usage, require global models (FORRESTER, 1976; see also MEADOWS *et al.*, 1973, p. 238). When we examine, however, how events would develop if population growth proved 'infeasible', a politicized alternative to the LTG's diagnosis becomes apparent. Con-sider two hypothetical countries. Country A has a relatively equal land distribution; country B has a typical 1970s Central American land distribution: 2% of the people own 60% of the land; 70% own 2%. In other respects these countries are similar: they have the same amount of arable land, the same population, the same level of capital availability and scientific capacity, and the same population growth rate, say, 3%. If we follow through the calculations of rates of population growth, food production increase, levels of poverty, and the like, we find that five generations before anyone is malnourished in country A, all of the poorest 70% in country B already are. Food shortages linked to inequity in land distribution would be the likely level at which they, and by implication most of the world's population, would first experience 'population pressure'. Aggregation of the world's population and resources into the

LTG's global model obscured the fact that crises will not emerge according to a strictly global logic, much less in any global form as such.

This simple example does not tell us how to analyze the politics of localities, nations, regions, or a world in which people contribute differentially to environmental problems. Our point here is simply to highlight the political dimension excluded by the science of SD in its analysis of global limits to growth. The LTG's moral and technocratic emphasis is, of course, by no means a unique characteristic of their study. Our critique of the LTG's science-politics can be extended to the current globalization of environmental discourse. Before doing so, let us first say a little more about this moral-technocratic alliance that such discourse generally presupposes.

In technocratic formulations, objective, scientific and (typically) quantitative analyses are employed to identify the policies that society (in the case of the LTG, humanity) needs in order to restore order or ensure its sustainability or survival—policies to which individuals, citizens, and countries would then submit. In the LTG these policies are deduced from the model structure, which is held to reveal a dynamic that the ordinary citizen, politician, or businessperson would not have recognized or specified. Moral formulations, in contrast, reject coercion and rely on each individual making the change needed to maintain valued social or natural qualities of life. Yet, in many senses the moral and technocratic are allied. The solutions appeal to *common, undifferentiated* interests as a corrective to corrupt, self-serving, naive or scientifically ignorant governance. Moreover, appearances notwithstanding, special places in the proposed social transformations are reserved for their exponents—the technocrat as analyst/policy advisor; the moralist as guide (TAYLOR, 1988).

Revealingly, the LTG report at numerous junctures combined managerial language and moral recruitment: "Until the underlying structures of our socio-economic systems are thoroughly analyzed, they cannot be managed effectively" (MEADOWS *et al.*, 1972, p. 181); "The economic preferences of society are [to be] shifted more toward services" (p. 163); "We cannot say with certainty how much longer mankind can postpone initiating deliberate control of his growth" (p. 183); "The two missing ingredients are a realistic, long-term goal that can guide mankind … and the human will to achieve that goal" (p. 184). In short, the global society needs management to achieve control; mankind, like an individual person, needs a goal and a will to change.

Global Modeling Today

Global climate models—or, more precisely, general circulation models (GCMs) of the atmosphere—have, especially since the hot dry summer of 1988 in the United States, provided a new scientific basis for projections of imminent global environmental crisis. The actual modeling technique bears no similarity to system dynamics, but, the language of the LTG lives on. More importantly for our argument, the science of global environmental change continues to reflect, and in turn reinforce, the moral-technocratic formulation of global environmental problems. Two observations about contemporary research will serve to illustrate this point and to remind us of alternative formulations that, as in the LTG case, tend to be obscured by globalized discourse.

First, consider the high premium that is currently being placed on reducing uncertainty about physical processes in GCMs. To date, GCMs concur in predicting an average global warming, but the projected magnitude of the increase varies among the models. Moreover, at the level of regional predictions, larger uncertainties and inconsistencies among the GCMs are evident. Indirect climatic feedbacks, creating new uncertainty, have now been added to the research agenda (LASHOF, 1989).

Tightening long-term projections or highlighting their severity is not, however, the only means by which policy responses to climate change could be catalyzed. As GLANTZ (1988) has observed, extreme climate-related events, such as droughts, storms and floods, already elicit socio-political responses that can be relatively easily studied. Recent and historical cases of climatic-related 'natural hazards' shed light on the impact of different emergency plans, investment in infrastructure and its maintenance and reconstruction schemes. Policymakers, from the local level up, can learn 'by analogy' from experience and prepare for future crises. Instead of emphasizing the investigation of physical processes and waiting for uncertainty to be eliminated before action is taken from the top, this approach calls for systematic analysis of effective vs vulnerable institutional arrangements. Such discussion of specific, local responses to climate change is not absent. Nevertheless, the vast majority of funds for global change research is currently being devoted to improving GCMs and allied climatic studies.

This dominance of physical climate research over institutional analysis points to the second issue, the hierarchy of the physical over the life and social sciences. This hierarchy constitutes an environmental determinism: the physics and chemistry of climate change set the parameters for environmental and biological change; societies must then adjust as best they can to the change in their environment. The hierarchy is evident in the conceptual and temporal relationships of GCMs to other areas of environmental change research. GCM research is over two decades old. Building on the prominence given to GCMs in the late 1980s, a second tier or research arose which has generated scenarios of agricultural, vegetation and wildlife changes. This research models the interaction of projected temperature and precipitation changes with regional soils, watersheds, timing of snowmelts, wildfire susceptibility, coastal upwelling, and so on. Following shortly after, a third tier of research was added which has been devoted to assessing the economic or security consequences of these biotic changes or of the more direct consequences of climate change, such as a rise in sea-level. Modes of geopolitical response to the global climate change threat then began to be discussed by political scientists. Finally, and most recently, social scientists and humanists have begun investigating popular understanding of global climate change, furnishing the bottom rung on the ladder from the hard and physical down to the soft and personal.

Of course, global change researchers know that climate change is a social problem, since it is through industrial production, transport and electrical generation systems, and tropical deforestation that societies generate greenhouse gases. Nonetheless, it is *physical change*—the mechanical and inexorable greenhouse effect—that is invoked to promote policy responses and social change. Moreover, the research undertaken often belies the stated awareness of the social dimension of environmental problems. Natural scientists, HARTE *et al.* (1992), for example, recognize that "designing conservation

policies without considering the role of existing institutions or societal responses to climatic change will likely lead to failure". Yet the same authors advise that "models work best for predicting change when the important underlying [physical and biological] mechanisms are well understood". Natural scientists have benefitted from the prestige and funding that have flowed down from the high-status climate simulations, fueling their confidence that political affairs can be influenced by technical knowledge without (or prior to) analysis of existing social arrangements. HARTE *et al.*'s research reflects this sense of politics, not the earlier caveat.

Again, the physical-natural-social scientific hierarchy is not necessary in the construction of environmental problems. Over the last 15 years, fields such as geography, anthropology, and international development studies have become increasingly sophisticated at analyzing environmental change as *socio*-environmental change. Processes such as deforestation, drought, land degradation and migration of 'environmental refugees' are shown to be, in their causes and their effects, social and environmental at one and the same time (WATTS, 1983; BLAIKIE and BROOKFIELD, 1987). The social dynamics are most apparent on the economic level: resource distribution determines whether and *for whom* a bad year becomes a drought. Inequities in land tenure and rural political power ensure that the rural poor will exploit land vulnerable to erosion, migrate to carve new plots from the forest, or add to the margins of burgeoning cities well before the resources of their original locale are exhausted. Industrialization and other opportunities for off-farm income can result in insufficient labor remaining to keep up traditional conservation practices. Such economic observations readily lead us to consider local particularity and historical contingency—in some areas traditional practices have resisted disruption by linkage into global markets and have instead contributed to environmental sustainability, while in other areas social organization has been rapidly restructured with significant environmental consequences (LITTLE, 1987; RICHARDS, 1985).

Sites of 'Deconstruction' of Global Environmental Change

In highlighting the moral-technocratic construction of global environmental problems, we hope to steer the attention of scientists and environmentalists towards the differentiated politics and economics of socio-environmental change. There are, of course, other sources of opposition to global and political formulations of environmental issues which threaten to render global environment discourse, like science-centered environmentalism in general, vulnerable to deconstruction. In this section we review some major places where globalization is disputed. Most of this opposition, it should be noted, centers more on disparities among nations than on the differentiated economic and political conditions within nations—a particular construction in its own right.

Global change knowledge was appropriated within the environmental activist community and employed to mobilize support for the movement's goals. The selective promotion of global change/warming increased support among prospective environmental supporters, and minimized opposition among the political and corporate

officialdoms in the advanced industrial countries. The popularization of the global warming notion was accompanied by, if not substantially based on, disproportionate stress on Third World sources of greenhouse gases, particularly tropical rainforest destruction. Tropical rainforest destruction probably accounts for less than 15% of global greenhouse gases and is a relatively minor source compared with industrial, transport, and other greenhouse gas emissions from the developed countries. The 'rainforest connection' has, however, been central in the scientific and popular construction of global change knowledge. At the level of environmental science, it has led to greater stress on the conservation biology of rainforest biodiversity, not only as a subordinate theme within the global environmental change framework, but also as a glamour topic in its own right.

As awareness of global climate change and the biodiversity implications of rainforest destruction grew in tandem, environmentalists came to focus the bulk of their efforts at two interrelated levels: on one hand, considerable activity was focused on the UN System (particularly UNEP) and other 'international regimes' in order to forge international conventions on climate change, biodiversity, and forest management (which were under investigation in preparation for a hoped-for ratification at the 1992 UN-sponsored 'Earth Summit' in Rio de Janeiro); on the other, environmental groups have sought to influence, and to employ the influence of, the international development finance and assistance establishment, particularly the World Bank/IMF, because of the important role of these institutions in affecting economic activity in the tropics. Within both of these fora, as well as among the international development intelligentsia and NGOs, environmental groups have played an important role in shaping understandings and policies with regard to 'sustainable development'. In particular, there is a very strong stress on rainforest environments and biodiversity in sustainable development doctrine.

The rise of global-change–led international environmentalism occurred during a significant shift of the political center of gravity of the industrial world toward neo-conservative regimes. Modern environmentalism has accommodated itself surprisingly readily to the global free-market resurgence. While international environmental groups yet reserve the right to criticize the World Bank and related institutions about the environmental destruction that results *from particular projects or types of projects* (especially dam and road construction and mining projects), environmental groups have generally worked with the Bank/IMF in a surprisingly harmonious manner in implementing conservation/preservation policies and programs in the Third World. There is a key coincidence of interest in the environmental group/World Bank/IMF relationship: the Bank and IMF gain legitimacy in the eyes of the citizens and political officialdoms of the advanced (increasingly 'green'-oriented) countries by helping to implement environmental and conservation policies, while the implied threat of Bank or IMF termination of bridging, adjustment, and project loans is useful in securing developing-country compliance with environmental initiatives. Given this relationship, most environmental organizations have been disinclined to take on the world debt crisis, the net South-North capital drain, and the international monetary order (which is substantially regulated by the World Bank and IMF; WOOD, 1986) as being fundamental contributors to environmental degradation.

The political economy of debt in the overall context of a stagnant world economy has become the principal parameter affecting both Third World development prospects and its environmental performance. It has largely been through the 'debt regime' that environmental agendas have been grafted onto Third World development planning. Only heavily-indebted countries, for example, have debt that is sufficiently discounted on the secondary debt market to be attractive to environmental groups for purchase in debt-for-nature swaps. Likewise, heavily-indebted countries are most subject to joint environmental group and development agency pressures to protect the environment. But as much as external debt has facilitated the implementation of environmental conservation policies, debt also serves to *exacerbate* environmental degradation. Third World countries that are most 'debt-stressed', and thus which are most in need of hard-currency export revenues, are most likely to see little alternative but to aggressively 'develop' their tropical rainforests and other sensitive habitats in order to maintain their balance of payments and service their debts. Environmental activism through the debt regime is thus likely to be a standoff: two steps forward, and one or two steps back.

Given these political and economic conditions, it is not surprising that a strong force for deconstruction of global change/discourse is that of the growing Third World reaction to 'environmental colonialism'. Developing-country opposition to international environmental regulation is increasingly seen as being likely to frustrate, if not prevent, the appearance or reality of meaningful international environmental conventions. This Third World reaction is surprisingly broadly based. Growing quarters of the Third World intelligentsia and the NGO community stress, for example, that international environmental organizations have exaggerated the Third World contribution to global warming, and that Western calculations of developing-country contributions to greenhouse gas emissions have failed to note a fundamental First World/Third World difference in the nature of these emissions: that between the 'survival emissions' of the South and the 'luxury emissions' of the North. But Third World criticism of global environmental regulation policies as 'environmental colonialism' also includes increasingly forceful opposition by Third World politicians and business leaders to proposed global change conventions on the grounds of their being an unjust violation of 'national sovereignty' (PEARCE, 1991). As the Earth Summit drew near, there were strong indications that it would be dominated by North-South acrimony as much as by environmental science.

Deconstruction of the science and the action program of global climate change is by no means confined to dissenting Third World voices or to those who speak for the interests of the world's poor. Spurred by contrary evidence within Western planetary science, dissent on the part of the propertied and powerful has also been expressed, e.g. the Bush Administration in the U.S.A. has largely remained a bulwark against rushing into a global climate change convention, invoking the lack of conclusive scientific evidence that there will be significant global warming, to justify their position.

Conclusion

The current globalization of environmental discourse, like the LTG debate in the 1970s, steers attention away from the differentiated politics and economics of socio-environmental change. As should be evident from this commentary we believe both the science and politics involving environmental change would benefit from a reversal of this trend. In drawing attention to the moral-technocratic construction of global environmental problems, we have also been promoting a sociological perspective on science, namely that interpretations and action, both scientific and social, are bound together, jointly reinforced by the formulation of problems, the tools available, the audiences being addressed and enlisted to act, the support (financial and otherwise) elicited, and so on. It follows that any reconstruction of science and politics must be a multi-faceted process drawing upon many more strands than simply a reconceptualization such as ours of the relationship between the knowledge claims and views about desirable social action. Nevertheless, the critical perspectives we have introduced allow us to anticipate some ways in which global environmental discourse, although powerful, remains vulnerable to dispute and open to transformation.

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The Ecology of Global Consumer Culture

Richard R. Wilk

Introduction

"Ecology" is not a word often associated with consumer culture. The worlds of shopping, fashion, and Hip Hop music seem far distant from problems of habitat destruction and pollution. But in this article I argue that these are not two separate issues, but a single one. Everything we buy, wear, eat, and drive connects us in some way to the natural environment through long chains of connections. And today those connections span the globe, so the things we consume may have traveled through several countries as they make their way from places they are produced and processed to our tables and closets. In modern industrial societies, we are all global consumers, and our choices, tastes, and desires have direct effects on people and environments all around the globe.

"Global" has become one of the key millennial buzzwords, and it is often used in a vague way that actually obscures key connections. As multinational corporations re-label themselves as "global enterprise solutions," academics are also inserting these trendy syllables into almost every conceivable discipline and context, producing an inexorable stream of slogans, monographs, and verbiage that threatens, like a lava flow, to bury all the old territory it passes over.[1] Anthropologists have several good reasons to stand aside and let the flood of global theory pass them by. Our experience with earlier models of global cultural change have not been particularly happy, from the unilineal evolutionism of the 19th century, through various forms of functionalism, into modernization and development theories. The spate of recent writing about globalization offers many reasons for caution. Beneath the trendy talk lurk a host of old outmoded dichotomies, dire predictions, and alarmist rants about the end of culture, or nature, or life as we know it (see Greider 1997, or Barber 1995). "Global" often turns out to mean "modern" or "western," technology is the prime mover, acculturation or ethnocide the main process, and the result will be the passing or the resurgence of traditional culture.

Some anthropologists who write about globalization downplay radical social change, and argue instead that global goods and images are domesticated and appropriated in each place. Local cultures will persist because they can absorb foreign ideas

and practices into their own system. A good example of this calm voice for the local is provided by James Watson's collection "Golden Arches East" (1997). Though McDonalds may be a global economic leviathan, we are told, it is also localized and appropriated into local culture everywhere. Other anthropologists assert that cultural trends that appear to be part of globalization are actually the result of long-term trends in an existing capitalist world system (e.g. Friedman 1994, Dirlik 1996). Still others raise methodological and empirical questions. Do we have the appropriate tools and concepts to even think about new global cultural phenomena? How does one study transnational and global processes? Are we even theoretically sophisticated enough to ask the right questions or gather the right data? (Wolf 1996).

Despite all these problems, I think it is worthwhile, even vitally important, for environmental anthropologists to engage with globalization. Ecologists, climatologists, and a host of other natural scientists are arguing forcefully that today's most serious environmental problems are inherently transnational, transboundary, multilateral, and multilevel (Puntenney 1995). If anthropologists are going to help solve key global environmental problems, we have to find ways to link levels of analysis upwards and outwards, instead of constantly taking refuge in the local settings where we do so much of our fieldwork (Kottak and Colson 1994). There is no place left on the planet where the impacts of global environmental, economic, and cultural forces are diminishing. Interdependence and integration are a fact. So, what would a global cultural ecology look like? The traditional avenues towards a greater integration of anthropological knowledge have been theoretical projects where people find unifying models of human behavior in universal properties of mind, biology, or culture. The notion of recurring functional regularities, and causal linkage between levels of analysis is particularly important in ecological anthropology. These ideas build on earlier forms of functionalism and on biological ecology and systems theory. Yet in the discipline as a whole, and within ecological anthropology, this work founders on a host of fundamental disagreements about human nature, the epistemology and politics of science, and the comparative method (Wilk 1996). While ecological anthropologists have generated many robust mid-level generalizations about the ways human ecosystems work (e.g. Netting 1993), most do not address the institutional and political complexity typical of global ecological problems. As Rappaport argued, the key to an anthropological contribution to global ecological issues is to find a way to include "both the 'microanthropology' of ethnography … [and] also the 'macroanthropology' of approaches such as world system theory, linkage theory, and the theory of adaptive structures" (1995:1).

One promising line for pursuing this integration is the exploration of institutional links, which connect many different constituencies, policymakers, and communities in processes affecting the environment. In response to the ways that environmental problems cross international and regional boundaries, Puntenney suggests, anthropologists should focus on the political and institutional relationships between the actors and groups responsible for both exploiting and managing ecosystems (1995). Yet, even in her own edited collection on anthropology and global ecosystems, most authors are thoroughly grounded in local situations. Global phenomena enter the picture when they take the form of new approaches to environmental management,

heightened recognition of environmental problems, the spread of ideas about sustainability, and trends towards co-management and local empowerment. None of the authors address the many kinds of production, marketing, and consumption that are so conspicuously transforming the local areas where they work. Globalization does not always follow institutional "official" channels and linkages, and indeed some theorists argue that conventional policy-making and development institutions are becoming irrelevant.

An early proponent of Political Ecology, Eric Wolf argued that "new forms of flexible capitalism" (1996:41) are the moving force behind increasing global flows of material and information. These flows are in turn critical to understanding local development and environmental change. Following Wolf, an adequate cultural ecology must include the history of global markets and politics, the global spread of cultural knowledge and artifacts, and the networks of finance, intergovernmental agencies, trade, migration, and domination, which now directly affect even the most isolated ecosystems on the planet. Building a global cultural ecology requires expeditions into territories of analysis that have been dominated by other disciplines for a long time.

Giving greater importance to global connections does not mean abandoning the local study of peoples intimate relationships with land and resources. The key is to find better ways to link specificities and generalities, to recognize systematic connections between the localities where we work, each with its own history and culture. Consumer culture provides one avenue towards forging these connections. During the last 500 years every part of the world has started to participate fully in a system where manufactured commodities have gradually replaced all kinds of objects and goods that were once provided by household and community economies. And almost everywhere people have begun to discover new needs for myriad goods and services, some as simple as metal pots and flashlights, and others as complex as cellular phones. This process leads to growing dependence on a cash economy and market connections, and a progressive shrinking of self-provisioning, a key hallmark of mass consumer culture. I suggest that the growth in human needs, particularly needs for increased levels of consumption of energy and goods, is a general process which has its own special dynamic, providing a means to make general sense out of many specific cases. Cultural ecology needs to incorporate the concept of consumer culture, if it is to make sense out of the environmental challenges of the next century.

Consumption as a Global and Local Ecological Issue

Consumption has been a key issue at every recent world conference on environmental issues and global climate change. All parties agree that the affluence of the North has been based on the consumption of huge quantities of non-renewable resources, and the consequent emission of equally vast quantities of waste. The fairness of different solutions to environmental problems is debated largely through a framework that connects wealth with high rates of consumption and greater ecological impact. Policymakers disagree about how these variables are related to each other and who will pay the price of change. Why should poor countries restrain their own growth to save

the environment, when rich countries are responsible for so much more of the damage the planet has suffered? Is it possible to have prosperity and economic growth without massive ecological consequences (Timmerman 1996:228)? The close relationship between consumption and sustainability of global environments is recognized in the Agenda 21 agreement.[2]

Global inequalities in levels of resource consumption are striking. Kennedy (1993) estimates that an average American baby at birth represents 280 times the environmental damage of a Haitian or Chadian baby. Every day a North American consumes 30 to 50 times more energy and materials than a person living in a low-income country like Honduras. Emissions of greenhouse gasses like carbon dioxide, responsible for changing the global climate, are also very uneven. North American CO_2 emissions are 5 tons per capita, compared to .19 tons per capita in southeast and south Asia (OECD 1997a, Redclift 1996). Yet while consumption is increasingly identified as a key component of global environmental problems, people do not agree on what forces are driving high levels of consumption, or what we could do to persuade or force people to limit their consumption (OECD 1997b, NRC 1997).[3]

At the global level over-consumption is an obvious problem, but it remains abstract and hard to tell apart from concepts like affluence or "standard of living." Do wealth and high consumption always go together? (The best answer seems to be, *not necessarily*.) Does an increased level of consumption make people happier? (Scitovsky [1992] says it makes them *less* happy.) Are human needs and wants infinite, or are there limits? (Nobody seems to know.)

Exactly the same problems crop up at the micro-level of ethnographic analysis of particular places and times. To make this point I return to fieldwork I did with Kekchi Maya swidden farmers in southern Belize from 1979 to 1981.[4] My goal is to show that issues of consumption are essential for understanding environmental change at all scales of analysis. And anthropologists, particularly cultural ecologists, already have many of the analytical tools needed to make sense out of consumption.

The Kekchi are tropical rainforest farmers. About 5,000 live in 30 villages scattered across a relatively isolated district which still supports large areas of primary and secondary forest. They hunt, fish, gather food and other wild resources, raise livestock, and grow a mixture of subsistence and cash crops. Some jobs are available in a nearby town and on some larger farms, and there are a number of small enterprises including retail shops, ecotourism lodges, trucking businesses, crafts, and other services.

I designed my study along the standard models of 1970s cultural ecology. I concentrated on the connections between the Kekchi swidden farming system and the social organization of households and communities. In particular I wanted to show how increasing population and intensification of agriculture led to changes in the domestic organization of labor and property, which in turn affected household formation and settlement patterns. But under the influence of Robert Netting, my dissertation advisor, my study considered broader aspects of politics, history, and the economic system. Instead of writing a study of purely local adaptations to an environment, I showed how hundreds of years of conquest, political domination, and shifting periods of "economic development" had been crucial in shaping Kekchi ecological relationships.

In writing about the Kekchi, I found it easy to fall into classic stereotypes. One was the story of functional adaptation—that the Kekchi were wise and crafty, finding clever and subtle ways to deal with risk, maximize their returns, and evade the manipulation of capitalists and governments. A second was the drama of victimization, as they were repeatedly driven off their land, drawn into capitalist farming (only to be dumped by fickle markets), missionized, taxed, regulated, and oppressed, then divided and set against each other. These are very conventional portraits of peasants and farmers in the ethnography of the last twenty years.

At the same time I saw many things that contradicted the stereotypes, and it took me years to fit them together in a way which made sense. One problem I noticed early on was that Kekchi people were not generally interested in talking about farming, land, or politics. What fascinated them endlessly were tools, gadgets, and consumer goods of all kinds. Hundreds of times a day people asked me about the prices and origins of the clothes I wore, my compass, watch, pencils, typewriter, glasses, lantern, and radio. On weekends people from the village would pay a substantial sum to travel into town. They could have saved the bus fare and bought what they needed in local shops, but they really enjoyed looking at things in shop windows, and on their return they would talk at great length about the prices and origins of different goods.

When I started to work out figures on labor use and yield in different crops, it became clear that a lot of families were cutting down on corn production for household use, and expanding their cash cropping. This forced many to buy imported foods from local shops at inflated prices. Older people lamented the shift away from home production of foods and crafts, and the growing dependence on things from stores. But even the oldest and poorest had long since given up making their own pottery and sugar, and everyone used flashlights, kerosene lamps, metal pots, laundry soap, and plastic dishes. While many households still grew their own coffee, or traded for it with neighbors, everyone considered Nescafe a superior drink, something to serve guests or to save for special occasions. Young men, still living with their parents, were particularly avid cash-crop producers, and they were the most likely to spend money on clothing, musical instruments, watches, liquor, cigarettes, and jewelry. Meanwhile their sisters would wring every penny they could from selling eggs or small crafts to buy cosmetics, jewelry, and clothes. Mature families with a number of older working children bought the village's "big-ticket" items, including corrugated iron roofing for a small shop, a bicycle, horse, radio, cement for flooring, or a chainsaw. Some people dreamed of owning a motorbike or a used pickup, or of sending their children to high school.[5]

From an ecological standpoint, some of this consumer behavior could be seen (with some stretch) as adaptive, as making ecological sense. Facing similar sorts of behavior in Amazonia, for example, Gross et. al. (1979) claim that the new tools are more efficient, and that the jewelry, watches, and guns are the best way to store money when banks and other investments are absent. This form of functional explanation is closely related to generations of economic anthropology that explain most kinds of conspicuous and luxury consumption as rational competition for "status" or as a latent means of leveling out surplus (or confusingly both at the same time). Researchers rarely thought about other ways of spending that could make much better ecological

sense. The goal seems to be to find good reasons why people might devote such great time and energy to acquiring objects which make little overt contribution to their survival, or the provision of their basic needs. As long as everyone in a society is producing enough to survive, anthropologists could treat the consumption of "status" or "symbolic" objects as customary or political. Potlatches and other competitive consumption of wealth could be seen as evidence that many societies was not functionally stable in pre-capitalist times (Edgerton 1992). What if a large part of the population was deprived of basic necessities, or enslaved, physically sacrificed, or killed in battle as a direct consequence of providing "luxuries" for someone else? How is that functional and adaptive for society as a whole?

These questions are not as far from the Kekchi case as it might seem. During my fieldwork I saw mothers selling the eggs from their family's chickens, to get money for Coca-Cola and candy, while their children clearly needed protein more than sugar. I saw men sell pigs to raise money to buy a boom box or a carton of cigarettes. The same money could have helped send their kids to school, or build a latrine, or improve their corn storage, or plant some cocoa trees. I was dismayed by these choices, but coming from such a wealthy consumerist society, how could I say that it was wrong to want better clothes, a cold beer now and then, or some nice recorded music?[6]

Kekchi families did not all approach consumer goods in the same way. Many people moved from village to village in response to both the costs and opportunities of participating in the cash/consumption economy. Some families moved towards roads, where it was easier to get to town, sell crops, find wage work, and buy goods. In Belizean English people described life near the road as "bright." This life also had its drawbacks. There was more competition for land, less cooperation between neighbors, and more crime and physical danger. Most important, the roadside villagers told me, was that people came to depend more and more on buying things, so that they needed money for everything.

Roadside life did not appeal to everyone. A surprising number of families moved in the opposite direction, or spent some time by the road and then went back "to the bush." Life in the villages away from the roads was "peaceful" and more secure. Anyone who was willing to work hard could feed their family. People might go to town once or twice a year. In the village they avoided the prying eyes of government officials and depended on each other. The cost of this freedom was poor access to health care and education, and very limited access to the market.[7] People could still live largely outside the market economy, if they were willing. The question for me was why so many people were not willing.

A historical note is needed here. It is very easy to fall into the trap of depicting the commoditization of Kekchi culture as a linear process. There are many accounts of how the "ancient and primeval" self-sufficient subsistence economy is now disappearing under the flood of modernization and market. But historical documents show that Kekchi people have moved back and forth across a whole range of mixed economies since the 16th-century conquest of their homeland. Many Kekchi have been urban town dwellers since before the conquest, and the shifting tides of peripheral capitalism have brought many waves of commoditization to the countryside. (The question of how people decommodify their lives during recession and depression

deserves study in itself). Nevertheless, it is fair to say that the sheer variety and amount of consumer goods and purchased items circulating in the Kekchi economy is much higher today than at any time in the past. I would expect to find this true in virtually every part of the world. Where once anthropologists found a material culture of bicycles, kerosene lamps, metal cook pots, laundry soap, and plastic jugs, they now find a proliferation of goods from kitchen blenders and electric irons, to gold jewelry, Avon products, and satellite television.

Any conventional cultural ecological analysis runs afoul of this change, because a functional analysis of "the system" requires some idea of what an average family "needs" to get through the year. To say that people have 'adapted' in the sense used by cultural ecologists, we must have a standard of living against which to measure resource use. Then, any idea about balance depends on what inputs are required to keep the system going. In my Kekchi research I thought that opening up "the system" to history and the effects of roads, markets, and the politics of land and resource management would be enough to contextualize the local ecology. But I found that the Kekchi way of life was not changing in direct response to population pressure, the encroachment of corporate farms, or government administrative policies. These are the classic destabilizing influences found in development studies (Wilk 1997b). Instead the key change in the Kekchi ecological system was a transformation in Kekchi "basic needs." What were once unobtainable luxuries had come to be considered necessities of life. Even in the most remote villages, nobody would think of making their own sugar or growing their own tobacco any more. In the cycle observed innumerable times over the last thousand years, wants had become needs, and new wants were appearing all the time (Illich 1977). Without consensus on how much a family needs a year, how can we model the amount of secondary forest a village needs to clear, or what population is sustainable given the existing resources? It turns out that at the micro-level of the community, we find exactly the same problem that plagues the global theorists. Needs keep expanding, and there is no consensus on what levels of consumption are appropriate, sustainable, or equitable.

Perhaps the most fundamental cultural change I have seen among Kekchi people has been that as commodities have become a larger part of their lives, they have come to believe themselves to be *poor*. In 1979 I spent a week trying to find a Kekchi translation of the words "rich" and "poor." Older men explained to me that the closest word was "*tok'ob ru*," which translated best as "misfortunate," people deserving of pity because they were sick or had lost close relatives. When I explained I was looking for a word that described a person who had few possessions, not enough food, a small house, and no respect from neighbors, the word they gave me meant "lazy." They explained that the only reason why people would live so badly was that they did not want to work, or maybe they were sick, had bad luck, or had been bewitched. Most Kekchi had no sense that they lacked basic necessities or lived an inferior lifestyle.

Twenty years later, it is common to hear Kekchi people state in public that "we Indians are poor because the government neglects us," or because they are robbed by foreign logging companies, or otherwise discriminated against in schools, in courts, and in jobs. All of these are objectively true. But in another sense it is very sad to see

people accepting, even rhetorically, a foreign definition of poverty measured in cash and consumer goods, because this definition implicitly devalues Kekchi culture and self-reliance.

Other Approaches to Consumer Culture

Anthropology belatedly took on the problem of consumer culture during the 1980s, though economic anthropologists had made some earlier efforts in that direction. Now we have abundant theories and studies of consumer culture in many parts of the world (see Miller 1995a, 1995b). Theories of consumption tend to revolve around three poles; consumption as utility, as identity, or as symbolic social competition. Carrier and Heyman point out in a recent survey that most of this work is "synchronic and psycho-cultural," that it largely ignores political economy (1997:355). While there has been a recent spate of ethnographies that focus on consumer goods in different cultural settings, there is little comparative work that tries to make any overall sense of how and why people develop new needs and tastes. The answer to these questions depends largely on the presupposed model of human nature which the investigator starts with (Wilk 1998, 1996).

This is not to say that we know nothing about what impels or constrains the development and expression of needs in different cultures. Much of classical economic anthropology can be read as accounts of how different cultures have limited and controlled needs, to channel or restrict competition within accepted social boundaries. Godelier's work on Baruya of New Guinea, for example, argues that social rules and ritual keep people from converting different kinds of goods into each other, or into political power, keeping competition within narrow boundaries. A "great gardener" by definition cannot exchange his surplus for trade goods or use it to develop a political following (1986). Economic anthropology also offers insights into the operation of envy, fear of envy, and witchcraft, in restraining consumption through means often lumped under terms like "image of limited good," or "leveling mechanisms."

Anthropologists have also provided examples of the ways that social competition can drive all kinds of excesses in accumulation and consumption of goods. Bring large quantities of cheap manufactured goods into an existing competitive feasting system, as in the Potlatch system of the Northwest coast in the early 20th century, and the results can be spectacular. More often, there is a gradual and quiet process of growth in the number and kinds of goods that people consider necessary. This more subtle process has largely been ignored by anthropologists. Understanding it will require long-term comparative data and ethnographic work. Because spending, allocation and consumption are intimate issues in many cultures, detailed and close observation of many domestic contexts is required. At the same time, all consumption is informed by life goals, cosmology, religion, and social priorities that require broad cultural analysis. Finally, we need to develop a comparative framework for understanding stages of development in consumer culture, types of consumer culture, and varieties of trajectories of change, that can make meaningful sense out of a variety of ethnographic and historical cases. This is a formidable task, but given the key importance of

the issues of consumption for every kind of environmental problem, we should not delay getting started.

Conclusions

Eric Wolf, Robert Netting, John Bennett, and others have argued for a cultural ecology that places politics, history, and cultural systems of meaning at the center instead of the margins. So far, this promise has not been fully realized. In practice, political and social issues tend to be included only when they directly affect resource use in a visible way, as when politicians appoint resource managers and set environmental policy. Applied cultural ecology has tended to consider ideology and cultural meaning to be a kind of justifying discourse or vague set of public values, ideas which make certain problems thinkable. I suggest that there are other important aspects of culture that also need to be included in modern environmental anthropology. Culturally defined sets of needs and standards of living, and the social processes that generate and mediate those needs, are central to understanding both local ecological relationships, and the general priorities that drive national and global ecological and economic policies. We need to keep our attention on the kinds of goals and values that drive economies, recognizing that even for very poor people, life is more than producing an adequate supply of calories and protein.

There are of course many places in the world where rural people face declining standards of living, ruined environments, increasing levels of exploitation, conflict, and misery. In the same societies, however, new middle classes pursue the "good life," building new towns and suburbs filled with appliances and other new products. The consumers and the destitute are indeed part of the same phenomenon, tied together in a single system, with equally important impacts on the natural environment. And even among the victims, we should recognize that rising levels of discontent, as well as pressures on resources, may be due as much to increased "standards of living," greater expectations, as well as population growth, or absolute economic decline.

I am not suggesting that the legitimate aspirations of rural people to improved water, medical care, or diet should be seen as somehow "to blame" for ecological problems (though I have heard this in unguarded moments from government officials and development workers). But what aspirations are legitimate? A bicycle? A few beers every week? A car for every Chinese peasant? A gallon of beer a day?[8] We have to recognize that the basic ethical and moral problems of peoples' economic goals are a part of political ecology. We cannot say we trust rural people to make their own choices and choose their own path, but then change our minds when their choice ends up being spending their money on cigarettes instead of integrated pest management. As environmental activists in many countries now recognize, questioning the meaning of the "good life," and helping people recognize the environmental costs of their consumption are important steps towards sustainability. In many countries, particularly in Europe, there is now discussion of how government policies and regulations can be changed to help limit, channel, and promote more sustainable forms of consumption. I hope that environmental anthropologists will find ways to join in these kinds of debates.

NOTES

1. On the excesses of "globalism" see cautionary tales from Miller (1997), Wilk (1995), and Abu-Lughod (1997). The strongest proponents of global transformation may be Appadurai and Hannerz though each temper their statements with a strong appreciation for the continuity of local social relations and cultural boundaries. Morley and Robbins (1995) provide an excellent and moderate summary of developments in global media and communications. My "global-babble" webpage is at http::www.indiana.edu/~wanthro/babble.htm.

2. Here is an example of the kinds of insights many derived from the Rio conference: "Paradoxically, the North is viewed as more conscious and respectful of environmental limits than is the South, when all available evidence shows that the environmental crisis has been precipitated almost exclusively by the North's wasteful and excessive consumption. Indeed, roughly 80% of the planet's resources, as well as its sinks, are being utilized by the 20% of the population living in Europe, North America, Oceania, and Japan. If the South disappeared tomorrow, the environmental crisis would be still with us, but not if the North disappeared." Banuri 1993:51.

3. It is somewhat ironic that at the same time that policymakers have identified the ever-growing needs of consumers as a "problem," many consumers have started to join various kinds of voluntary simplicity movements, and there is a proliferation of anti-consumer publications, groups, and foundations.

4. In Guatemala the orthography "Q'eqchi" is now preferred, while various different spellings are in use in Belize. My monograph on Kekchi agriculture and households is Wilk 1997a; there are also several papers addressing different aspects of Kekchi consumption, particularly houses (Wilk 1989).

5. Remember that this was in 1980. In the early 1980s many Kekchi villages made a lot of money growing marijuana, and others expanded into cacao and other then-lucrative cash crops. Pickups and concrete block houses became common in some places; today boom boxes and TVs are widespread, and a much larger variety of consumer goods is available in all areas, though cash incomes are still far lower than in other parts of Belize.

6. The way farmers spend their money should have an obvious affect on their farming success, though few anthropologists have studied this relationship. In Belize, Mennonite farming has been tremendously successful, partially because so much of their earnings are directly reinvested back into farming and food-processing and marketing enterprises.

7. There are a surprising number of people living like this in rural Indiana, where I live now. It is still possible to remain largely outside the cash economy in many rural areas of the United States. This raises the key question of whether or not "low income" really means "poor."

8. Horowitz (1988) reports that a gallon of beer a day was considered the absolute minimum acceptable standard ("poverty line") for working men in many 19th-century cities.

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A World without Boundaries
The Body Shop's Trans/National Geographics

Caren Kaplan

> For me Trade Not Aid also advanced the possibility that one day we would be able to go to the source for all our products—cut out the middlemen and trade directly with those people throughout the world who grew or harvested the raw ingredients we needed. That was my ambition. I wanted to be Christobel Columbus, going into little villages in Mexico or Guatemala or Nepal and seeing what they had to trade, instead of going to those boring old trade fairs where everyone buys the same mediocre products year after year.
>
> —Anita Roddick[1]

Just how tempting and powerful is the notion of "a world without boundaries" at this historical juncture? A world without boundaries means many things in postmodernity; not only solace from nation-state terrorism at fraught borders or relief from the vast policing of citizenry through the computer data of everyday life, but also the articulation of an economic order. For an entrepreneur such as Anita Roddick, the founder of The Body Shop, a world without boundaries signifies the freedom to imagine a link between European merchant/explorers and present-day multinationals; free trade without middlemen means liberation. The notion of a "world without boundaries," then, appeals to conservative, liberal, and progressive alike—the multinational corporation and the libertarian anarchist might choose to phrase their ideal world in just such terms. But can the formation of free trade zones and postmodern theories of diasporic subjects be equated?

I am interested in the representation of "the world" as it appears in several linked but distinct discursive formations. In particular, I am concerned with the resonances between contemporary cultural criticism and popular culture. Articulations of theories

of diaspora, for example, might be seen to be produced by some, if not all, of the same interests that produce a slogan for a Ralph Lauren perfume, such as "a world without boundaries." Yet, it would be reductionist, even purposeless, to confuse all sectors of society with one another. If a yearning for boundarylessness can be linked at all to the destabilization of the nation-state, I would argue that such a link must be carefully historicized and contextualized. More specifically, I would like to illustrate this methodological and political challenge by posing two related questions: how do Euro-American feminist discourses propose "worlds without boundaries," and what complicities with and resistances to transnational capital can be discerned in the practice of these feminist articulations?

Trans/National Geographics: Mapping Gender Commodification in a New World Order

> *National Geographic*'s articles on travel offered the housewife an escape from reality to remote places of the globe and enabled her to enjoy the fantasy position of entering into situations completely different from her own life. The *Geographic* made the housewife happy and productive. It refreshed, enlightened, and inspired her to prepare "something different for dinner that night," but most importantly, it did so without inspiring her to step out of place and upset the conditions of her everyday life.
> —Lisa Bloom[2]

Just as *National Geographic* magazine has promulgated gendered national interests throughout the twentieth century through representations of managed cultural difference, print and visual media today articulate contemporary versions of geopolitics and gender. If the "national" is increasingly destabilized in favor of more transnational modes of social and economic organization, then the geographics of that world order can be recognized as under construction in media and advertising. Inasmuch as this particular construct has much at stake in mystifying the globalization of capital and celebrating the "national" character of "authentic" cultural differences, I am terming it "trans/national"—that is, the representation of the "world" in these forms of advertising signals a desire for a dissolution of boundaries to facilitate personal freedom and ease of trade even as it articulates national and cultural characteristics as distinct, innate markers of difference. Enabled by transnational capital flows, these representations are heavily invested in signs of traditional, non-metropolitan industries (marked as "native," "tribal," or "underdeveloped").

Such commodifications of cultural difference are profoundly gendered as well as imbricated in the production of other versions of alterity. To make such an assertion, however, is not to make claims for a unified subject of gender. *Different* women are formed through late capital's interpellations in different ways, often through the representation of travel and tourism.[3] I want to turn, then, to advertising that represents a certain kind of feminist project, constructing a Manichaean relationship between a feminist agent (consumer/entrepreneur) and her "other" (the indigenous female producer/resource), forming a trans/national geographic. As Rey Chow has argued, the "production of the native is part of the production of our postcolonial modernity."[4] I

would add that the Euro-American feminist production of the native is part of the production of postmodernity; that is, apparently progressive gender politics articulated through liberal discourses of equality and self-empowerment may participate in the *re-objectification* of the "gendered subaltern subject."[5] Euro-American "global feminism" homogenizes economic and cultural difference in favor of a universalizable female identity or set of sexual practices while simultaneously stressing cultural "difference" as a marker of value in an increasingly homogeneous world. That is, Euro-American, metropolitan feminism participates in the construction of cultural hegemonies even as it may also resist and strategize against such globalization. The question becomes who sets the terms of difference and similarity, who controls such representations, and, of course, at whose expense do these globalizations and resistances to globalization come?

Film, video, print, music, "high" art as well as "low," all market differentiation and heterogeneity for contemporary consumption. Advertising, conversant in transnational markets and communications technologies, provides some of the most temptingly condensed messages about gender, global culture, and the relationship between local producers and global consumers. Producing local difference out of globalization is the hallmark of an interlocked series of advertisements for The Body Shop, a multinational corporation with a British accent, that markets products through appeals to a set of liberal political affectations. It is not insignificant that The Body Shop takes a principled stand *against* advertising, pointing to the absence of a "marketing" department in the corporation as part of a critique of mainstream business practices.[6] Yet, The Body Shop, without "advertising," has managed since 1976 to achieve high visibility for its products and corporate identity through effective manipulation of news organizations that keep the corporation in the "news" and through visually striking displays in the shops, corporate packaging, shipping, and catalogs. Presenting itself as resolutely counterculture, The Body Shop has reworked the conventions of publicity to achieve a spectacularly successful mode of representation.[7] Therefore, I will refer to the visual and textual representation of the corporation and its products as "ads" as a way of resisting corporate discourse and to call attention to important shifts in marketing practices in a transnational context.

Increasingly, such shifts construct female subjects in new ways. In examining The Body Shop's corporate representation, I am not arguing that mainstream advertising is monolithically constructed against women through the hegemonic deployment of sexist representations.[8] Current advertising is replete with references to bourgeois feminist concerns; that is, middle-class and wealthy women are hailed as consumers with extremely significant buying power. Rather than interpret this state of affairs as the triumph of feminism, I view this process of ideological interpellation as one of a series of complex negotiations between Euro-American mainstream feminist efforts to consolidate subjectivity around raced, classed, and sexed bodies and the efforts of advanced capital to expand markets and construct new agents through cultural representation. And many of these ads depend upon a postmodern, postcolonial situation; that is, the consumer knows about centers and peripheries in a number of contradictory ways and must be brought into a particular trans/national logic, interpellated through visual and financial consumption into a seemingly voluntary and historically

specific relationship with global politics. Such a trans/national geographics advertises the downplaying of nation-state identities (except as ethnic or cultural "traditions") in favor of a generalized metropolitan or cosmopolitan site of consumption where "women" can "travel" in a world "without boundaries" through the practices of consumer culture.

Body and Soul: Traveling Trade and the Ethics of Exploitation

> I think all business practices would improve immeasurably if they were guided by "feminine" principles—qualities like love and care and intuition.
> —Anita Roddick[9]

> What I am suggesting is that at the end of the kaleidoscopic tunnel of the postmodernist text (art-text or commodity-text) there still sits the figure of that most traditional moral authority—the Author/Producer.
> —Paul Smith[10]

In his analysis of the corporate postmodernism of the Banana Republic throughout the 1980s, Paul Smith reads the advertising copy of the successful catalog as the evacuation of history from its purposeful representation. That is, in advertising that makes appeals to a "history" (here of European imperialism), the complete mystification of histories of social relations results in "stories" that bolster the corporate image of maverick trader. That such a world has been produced through the appearance of adventure and the history of oppression is, of course, not news but still requires readings against the grain. If the Banana Republic catalog has vanished, the J. Peterman version has risen to take its place. And if the Zeiglers, who founded Banana Republic, sold out to The Gap, they have resurrected the entrepreneurial spirit of empire with a "boutique" mail-order company called the Republic of Tea. All of these companies rely upon the "signature" of an "author" whose days spent roaming the globe signal the singular "trader/travel writer" who brings home the booty—information *and* goods. Value is accrued through the representation of personal travel, attested to by narratives of touring and discovery, and evidenced in the display of individually selected, "unique" items for sale.

The Body Shop has its own "author" and "producer" in the highly visible figure of Anita Roddick, the founder and current managing director. The corporate mythology of iconoclastic business against a heartless mainstream has found its literary articulation in the 1991 publication of Roddick's autobiography, *Body and Soul* (available through catalog and shop sales). As Shekhar Deshpande and Andy Kurtz have argued, *Body and Soul* represents Roddick as "undoubtedly vanguardist" yet promulgating a "*nostalgic* valorization of the petit-bourgeois subject-position where success is measured in terms of human perseverence, common sense, and a suspicion of hermetic bureaucratic structures."[11] Embodying that ethos and claiming to be an idealistic, 1960s "flower child," Roddick has traded upon her lack of conventional training in business to distinguish her company from others in an increasingly crowded field of "green" industries. She has also stressed her female-centered point of view, emphasizing that

her choice of a business in soaps and scents came from her experience *as a female consumer*. Forceful, flamboyant, and feminist, as a spokesperson for environmentalism as well as for her company, Anita Roddick is, as John Kuijper puts it, "the best selling commodity at The Body Shop."[12]

The values of entrepreneurial individualism, hard work, independence, and corporate responsibility that reverberate throughout Roddick's memoir and all The Body Shop texts and representations echo the fundamental precepts of Western autobiography as well as Western capitalism. Risk-taking yields knowledge of self and industry produces a community of responsible individuals. Travel (recalling an earlier era of capitalism) is required, both for the opportunities it affords for spiritual reflection and for the identification of new sources of materials and expansion of markets. In fact, Roddick often refers to both Columbus and Crusoe as models for her ideal entrepreneurial spirit. References to "adventure" abound along with admonitions to be frugal and give something back to the community. The founder of The Body Shop, a company whose pretax profit rose 20 percent to $15.2 million in the six months ending 31 August 1993,[13] claims that money means nothing to her, writing in her memoir:

> I am such a tramp, such a nomad. The accumulation of wealth has no meaning for me; neither has the acquisition of material riches. … I think the value of money is the spontaneity it gives you. There are too many exciting things to do with it right now to bother about piling it up, and in any case it is ennobling to give it away.[14]

Words to make Robinson Crusoe spin in his grave, perhaps. But then again, like Defoe's fictional protagonist, Roddick struggles with the spiritual meaning of life in the face of accumulating profits. This corporation *makes money* and the imputation is that it is the founder's very puritan work ethic (mediated by 1960s counterculture tastes) that makes it all work so brilliantly. Roddick's "origin story" includes Italian immigrant parents who settled in a seaside town in England, stints as a teacher and U.N. worker, early childbearing, a peripatetic husband, progressive politics, and a passion for hard work. Along the way, Roddick becomes a die-hard environmentalist *and* a millionaire, joining such companies as Ben & Jerry's in the vanguard of alternative, "ethical" corporations.

Even a company that grew phenomenally throughout a devastating recession in England and abroad will accumulate critics and ill will. The Body Shop has been under fire from the Left and the Right for some years, garnering lawsuits and attacks along with awards and homages.[15] The most recent, high-profile attack stems from an article by John Entine in *Business Ethics*, charging The Body Shop with hypocrisy in its stance against animal-testing as well as misleading the public about the "natural" characteristics of its products and mishandling franchises.[16] The entire Entine affair is a good example of the lucrative cross-referencing at work in transnational capitalism. The flurry of articles in newspapers and spots on television news that covered the rancorous exchanges between Entine and The Body Shop in effect superbly advertised Entine's six-page text. *Business Ethics*, a magazine with a relatively small circulation, published thousands of extra copies and issued press releases, thereby raising its visibility in a kind of piggy-back publicity onto The Body Shop's outraged response. In the media frenzy that ensued there were ample signs that a fickle public (led by an even

more fickle press) is ready to tarnish the saintly image of The Body Shop. That these more mainstream attacks occur just as U.S. and Japanese competitors rev into gear against The Body Shop's full-scale entry into their national markets (and as The Limited's Bath and Body Works begins direct competition with The Body Shop on its home ground in England) suggests that the appearance if not the practice of national trade interests have not yet been superceded.[17]

Embattled, but a significant multinational trader of continuing growth, The Body Shop's increasingly high profile in the United States in the last three years can be linked in part to a strategic alliance with the transnational giant, American Express. As Roddick notes in her memoir, The Body Shop's entry into the U.S. was planned for years in advance and very carefully orchestrated.[18] A number of newspaper articles and business writers expressed skepticism about a "no-advertising" policy in the mall-dominated U.S. market. For example, Harvard Business School professor Stephen A. Greyser was quoted in the *Wall Street Journal* as saying that The Body Shop's entry into the U.S. would fail without "major launch advertising."[19] Roddick, to prove that her business acumen is transgressive and successful, responded by printing up post-cards that quote Greyser along with her response: "I'll never hire anybody from Harvard Business School. People are international. Ideas have wings. If we can manage in Chinese-speaking countries and in the Middle-East, why do they think America's going to be such a problem?"[20] Yet, obviously the U.S. presented a unique set of challenges that required new strategies, including an agreement with American Express to produce both television and print advertisements for the well-known credit card that would "star" Anita Roddick.

The American Express/Body Shop ads can be read as the celebrity marriage of entrepreneurial capitalism to bourgeois feminist travel-and-adventure motifs. Hailing a gendered consumer, the ad presents the figure of Anita Roddick as a kind of environmentally responsible feminist cum explorer who will guide us in the adventure of shopping. In the hallowed format of many American Express ads before this one, we are asked, "Do you know me?" In the following text, Anita Roddick introduces herself to a broader U.S. consumer base through her corporate philosophy and practice:

> For me, the joy of selling bubblebath is to take that profit and do something with it. "Trade Not Aid" is a way of trading honorably with indigenous communities in disadvantaged areas—not changing the environment or the culture. Instead, we listen to what these people need and try to help them with it. What we bring back with us are stories—how they do things, the connections; the essential wisdom of indigenous groups. Stories are the soul of The Body Shop. Customers come into The Body Shop to buy hair conditioner and find a story about the Xingu reserve and the Kayapo Indians who collect Brazil nuts for us. We showed them a simple process for extracting oil from the nut, which consequently raises the value of the raw ingredient we use. The result is we pay them more for it, and that gives them an alternative to their logging income, which in turn protects the rain forest. That's what we mean by helping through "Trade Not Aid."[21]

In unpacking this text, I want to emphasize several key points. First, the ad copy refers to a site of consumption that can only be in a metropolitan location where information about the Xingu reserve and the Kayapo Indians will be pleasingly novel. It assumes that a customer in the metropole will enter a store to buy a mundane item

such as hair conditioner only to procure simultaneously something "different." Secondly, it is implied that consumption leads not only to the pleasure of owning something but to the acquisition of a moral object lesson in Roddick's entrepreneurial philosophy, a set of practices she calls "Trade Not Aid." Trade Not Aid emits bits of 1980s-style Thatcher/Reagan injunctions in the 1990s, displaying a savvy, neoconservative message all wrapped up in environmentally sensitive packaging. Finally, Roddick mystifies the conditions of production through primitivism. The Kayapo, a tribe that is well-known in anthropological and environmentalist circles for resisting both national and corporate domination by utilizing sophisticated media, are depicted as simple "story tellers" who convey an "essential wisdom."

The images that accompany the text include Anita Roddick embracing "native" women who are dramatically tattooed and painted, bargaining for goods in a "colorful" market, and looking thoughtfully into space while wearing a hat that suggests "ethnic" fashion. Roddick's memoir contains many more of these photographs—all emphasizing her "going native" in her manner of dress and always marking the extreme cultural difference between "natives" and the entrepreneur from Littlehampton, England. *Body and Soul* is filled with examples of Roddick's search for authentic exotica and arcane beauty and bathing "secrets" based on "natural" ingredients (usually food stuffs such as fruits and vegetables). The company is founded on the premise that its products are inspired by Roddick's interactions with locals as she travels ("about four months every year").[22] The American Express ad emphasizes this aspect of Roddick as world-traveler and explorer, depicting her as fearlessly venturing among "indigenous communities in disadvantaged areas" in order to exchange First World assistance for Third or Fourth World products and labor. The presumption is that Anita Roddick is personally bringing economic aid to a periphery (here figured as "native women") and that the cosmetics marketed in The Body Shop are imbued with the moral and political value that such "pull-yourself-up-by-your-own-bootstraps" activity accrues.

Roddick appears to have reached the apotheosis of her desire to teach and make a difference in her invention of Trade Not Aid. Referring to this practice as an "international trading policy," Trade Not Aid differentiates itself from business as usual: "most multinational companies don't give a damn about the Third World," Roddick asserts.[23] Following her belief that the "Third World" needs "work rather than handouts," Roddick has trod upon some complicated ground. For example, her first project, the production of wooden "footsie rollers" in a Boys Town in India, went, in her words, "terribly wrong."[24] Completely bamboozled by local agents, rapturously embracing the "simple" way of life they thought they had "found," Roddick and her business partner and spouse, Gordon, raised funds among their franchises and affiliates to build another "town" for more unfortunate orphans. Meanwhile, the local agents simply pocketed the money for the rollers and had the product made off-site in sweat-shops. Once this deception came to light, the Roddicks, devastated by what they perceived as a betrayal, decamped to other locations including Nepal, Brazil, Mexico, and Indian reservations in the southwestern United States.

While Roddick declares her paper-making project in Nepal to be one of her most successful Trade Not Aid ventures, I am most interested here in The Body Shop's

excursion into the rainforest of Brazil. The Kayapo Indians have been the subject of numerous anthropological studies and, most interestingly, have developed syncretic, complex strategies of dealing with the destruction and usurpation of their land by government-sponsored development projects. The emergence of "indigenous media," cogently discussed in the work of Faye Ginsburg, Terence Turner, and Robert Stam and Ella Shohat, to name only a few, is conveniently ignored in Roddick's accounts of her visits to the Kayapo.[25] Instead, she muses upon an appropriate gift in return for the hospitality she has received and decides that a camcorder for every village would allow the Indians to "record all their collected customs, legends and wisdom about the rainforest, its animals and plants."[26] Here, Roddick's urge to erase the "middlemen" means that the agency of the tribe has been undercut, since there is no mention of an already flourishing video culture among the Kayapo nor the existence of the *Centro de Trabalho Indigenista* (Center for Work with Indigenous Peoples), which offers assistance with editing and other technological aspects to many of the rainforest tribes. In Roddick's rather breathless account of the Altamira demonstration against the destruction of the rainforest, an event that is presented as spiritually transformative for the Euro-American environmentalists/tourists, there is no acknowledgment of a long history of indigenous activism and resistance that might bring about such an occasion. Similarly, bringing beads to the Indians to be fashioned into "one of a kind" bracelets as a way to augment the Brazil nut oil industry resonates with tales from earlier European colonial encounters with "native" people; "trinkets" bartered for valuable resources have a long history that is refashioned here into a credo of noninterference in a way of life that is valuable only inasmuch as it remains utterly "different."

In discussing The Body Shop in *Beyond the Pale*, Vron Ware points out the classic "missionary discourse" and the correspondingly condescending tone in Roddick's interviews and advertisements, including an "uninhibited use of 'we,' meaning 'First World', and 'they,' meaning 'Third World' (that is, underdeveloped)."[27] I would push this observation further, because the distinction does not just simply exoticize the people Roddick meets in her travels or erase historically specific references to cultural and economic imperialism. Rather, The Body Shop discourse establishes a complete dichotomy between developed and underdeveloped, between First and Third World, such that any complex distinctions and differentiations within those categories are conveniently suppressed. We're left in a vaguely postcolonial zone of vanishing natives who require managed altruism from a concerned source of capital development. There are no complex metropolitan sites in The Body Shop's representation of periphery, nor are there metropolitan sites in which differentiated middle classes and elites themselves have any complicated stakes in development *or* underdevelopment. There are only "natives" and the "West," mediated by the benevolent capitalism of The Body Shop. This is a representational practice that homogenizes through the construction of binary oppositions, which depend upon and recycle the stereotypes and bigotries of an earlier era, and further construct a global feminism through the mystification of the operation of transnational capital.

Profits with Principles: Don't Leave Home without Them

In the old days, the great British retailers may well have been driven by the profit motive but they were also great philanthropists, functioning pillars of society and builders of the community. Their monuments were museums and cultural foundations. Now what is the retailing industry building? Shopping malls!
—Anita Roddick[28]

It is precisely the proclaimed dissolution of public and private on the botanized asphalt of shoppingtown today that makes possible, not a *flaneuse*, since that term becomes anachronistic, but a practice of modernity by women for which it is important not to begin by identifying heroines and victims … but a profound ambivalence about shifting roles.
—Meaghan Morris[29]

Trade Not Aid accounts for approximately one percent of The Body Shop's business. While most of the company resources are not committed in this direction, a large proportion of the corporate publicity is devoted to the representation of this policy. What is particularly chilling to me is The Body Shop's *representation* of a corporate *replacement* of the nation-state. It appears to be The Body Shop that funds and manages development projects, just as it appears to be The Body Shop that addresses health care, financing, and environmental concerns in its global reach. Because the liberal state has failed to address adequately micropolitics and macroeconomics, luring its citizens with dreams of progress and inclusion even as it structures inequalities into governmental principles, it leaves itself open for such "private" wish fulfillment. Who would not want some big, benevolent force to come and take care of everything (and who cares if the benevolence is based on a specific profit margin)? Like the big "fix-it" shop that its name puns upon, The Body Shop promises quick, cosmetic solutions: feel-good capitalism and warm, fuzzy geopolitics.

As part of Roddick's dream to "cut out the middlemen," her representational strategy is to excise all mediating agents. Regardless of country or location, there is little evidence of governments, banks, local elites, or any other mediating factors or agents (except as bumbling obstacles). There is only The Body Shop and the subaltern, indigenous subject in need. Although in her memoir Roddick mentions numerous "helpers" and facilitators, including translators and handlers, the catalog copy refines the discourse into a purer form. Here, it is simply "Anita" who makes the treks, bargains and barters with natives, and returns with stories and goods. While the company identifies target populations and sites for increasing production and access to exportable products, it markets a nostalgic narrative of "discovery" and entrepreneurial feminism. Thus, despite its global reach and transnational representational strategy, The Body Shop also recuperates the center and margin paradigm. As the American Express ad reminds us: "Don't Leave Home without It." Those of us who view this ad have "homes" in a "center" where we order goods from a "margin."

While The Body Shop ads are, in many ways, completely incoherent, their logic is that proposed by a world-system model. They posit a world that requires salvation from homogenizing globalization but ensures further exploitation through the unequal

power relations of managed "modernization." The contradictory discourse of trans/national geographics represents a world that is composed of center and periphery, yet the periphery is always on the point of vanishing. That is, there is no part of the globe that is seemingly unreachable—Anita Roddick has been literally *everywhere*. In researching difference to provide products for her business, she reinvents the periphery. On the one hand, she embraces modernization in order to alleviate underdevelopment; on the other, she constructs a world of differences that can never be homogenized for fear of depleting the imaginary resource of the exotic. Thus, to return to the American Express ad copy for a moment, the main narrative suggests a "story" of rational, managed exoticism in the periphery, where the extraction of "natural" ingredients for metropolitan cosmetics promises prosperity to a devastated local economy. Yet, the last few lines of ad copy destabilize that parable of modernization: "The travel I do is dangerous." "I am in bizarre places, remote places." Here comes American Express to the rescue, for apparently these dangerous, bizarre, and remote places are still linked to transnational capital—they "take" American Express!

Both the written text and the images in these ads glamorize and seek to legitimate unequal transnational economic relations in ways that suture modern and postmodern. That is, these meticulously produced inducements to consume operate by suggesting the modern and postmodern simultaneously through recourse to the modern discourses of travel, adventure, "international understanding," and development mediated by extremely contemporary technologies. Mass consumption, then, becomes a mode of travel that uses nostalgia for the modern past as a panacea for an uncertain present. Consumption is also a mode of production; it produces dominant images of a world of difference without boundaries and it creates sites or places where these ideas become practice. Mass consumption, as Robert David Sack puts it, is among "the most important means by which we become powerful geographical agents in our day-to-day lives."[30]

Yet, trans/national geographic agency is not evenly distributed or unproblematically assumed. Back in the putative "center," metropolitans have the luxury of manipulating the images of links and disjunctures, fantasizing *contact* with difference while maintaining a comfortable distance. Rather than use consumption as a way to learn about the operation of trade, to historicize the way the circulation of goods and money actually creates the world, to forge affiliations and alliances out of analyses of divisions of labor or patriarchal fundamentalisms, for example, metropolitans opt for romanticized representations of diversity. The shopping mall is the most obvious manifestation of this trend. A bigger and more postmodern variant on the collecting mania displayed in the bourgeois department store, the mall (like a mail order catalog) forms a site of consumption where everything appears to come to the consumer, effortlessly and in excess. To quote Sack again, by severing our connections to the world, such "places of consumption encourage us to think of ourselves not as links in a chain but, rather, as the center of the world."[31]

Binaries of center and periphery, global and local, and other oppositional representations of the world seem to produce fantasies of boundarylessness that only reinscribe essentialized difference. The myth of a "world without boundaries" leaves our material differences intact and even exacerbates the asymmetries of power that

stratify our lived experiences. To put it bluntly, few of us can live without a passport or an identity card of some sort and fewer of us can manage without employment. Our access to these signs and practices is deeply uneven and hardly carnivalesque.

In addressing the representational strategies of The Body Shop, I do not mean to suggest that it is a particularly reprehensible business (although it may be more duplicitous than some other corporations in protesting so vigorously against what it performs so well). I am interested in reading its representations against the grain simply to demonstrate that advertisements mask the workings of "business" or commerce in favor of the production of imaginary communities and subjects. It would be difficult to identify contemporary subjects who are *not* interpellated in the world-making activity of consumption. Collaborative studies of corporate practices, sites of consumption, and subject formation would contribute to a fuller and more accurate account of the phenomenon I have begun to examine here in a partial and preliminary fashion. Inevitably, as Meaghan Morris points out, the older models of travel will yield to other analyses of displacement. If both the explorer and the *flaneuse* drop out of our deconstruction of the subject of mall culture, then what articulations remain? Rather than echo American Express's Enlightenment question ("Do you know me?"), we might well ask: What work must we still do to come to know each other without engendering violence? In deconstructing the historically specific representations of a world without boundaries, we come to recognize its powerful allure for Euro-American metropolitan feminism, an allure that can only be resisted and critiqued and never, in these exact terms, be bought.

NOTES

1. Anita Roddick, *Body and Soul* (New York: Crown, 1991), 165–66.

2. Lisa Bloom, *Gender on Ice: American Ideologies of Polar Expeditions* (Minneapolis: University of Minnesota Press, 1993), 72.

3. I am interested in the construction of female subjects in this essay but my focus does not foreclose a discussion of this very process in the formation of male subjects and transgenders, for example.

4. Rey Chow, *Writing Diaspora: Tactics of Intervention in Contemporary Cultural Studies* (Bloomington: Indiana University Press, 1993), 30.

5. Here I must reference Gayatri Spivak's deeply illuminating, somewhat problematic, and always useful essay, "The Political Economy of Women as Seen by a Literary Critic," in *Coming to Terms: Feminism, Theory, Politics*, ed. Elizabeth Weed (New York: Routledge, 1989), 218–29.

6. In her memoir, *Body and Soul*, Roddick attacks the cosmetics industry for spending "obscene sums" on advertising and packaging and points out that such costs are passed on to the consumer: "We have never spent a cent on advertising. At the beginning we couldn't afford it, and by the time we could afford it we had got to the point where I would be too embarrassed to do it" (20).

7. The corporate annual report for 1994 notes that "someone buys from The Body Shop somewhere in the world every 0.5 seconds." The annual report for 1993 writes on its table of contents page: "On 29 February 1992, The Body Shop was trading in 41 countries and 19 languages. Numbers of stores worldwide: 727 (210 UK and 517 international). … Frequency with which shops open: 1 every 2.5 days …"

8. Some versions of Euro-American feminist critique of mass culture and advertising have taken such a line. See, for example, Rosalind Coward, *Female Desires: How They are Sought, Bought, and Packaged* (New York: Grove, 1985); Tania Modleski, *Loving with a Vengeance* (New York: Methuen, 1982); Erving Goffman, *Gender Advertisements* (New York: Harper and Row, 1976); and John Berger, *Ways of Seeing* (London: Penguin, 1972).

9. Roddick, *Body and Soul*, 17.

10. Paul Smith, "Visiting the Banana Republic," in *Universal Abandon?: The Politics of Postmodernism*, ed. Andrew Ross (Minneapolis: University of Minnesota Press, 1988), 145.

11. Shekhar Deshpande and Andy Kurtz, "Trade Tales," *Mediations* 18 (1994): 34.

12. John Kuijper, "The Entrepreneur, Exotic Collecting, and Consumer Culture: A Critical Reading of Body Shop Practices and a Challenge to Change the Model Retailer" (unpublished ms.).

13. See "Body Shop Reports Rise in Pretax Profit of 20% for First Half," *Wall Street Journal*, 15 October 1993, B8.

14. Roddick, *Body and Soul*, 257–8.

15. "Puff pieces" on The Body Shop appeared regularly in the *New York Times* throughout the late 1980s and early 1990s. See, for example: Linda Wells, "Venturers," *New York Times Magazine*, 4 February 1990, 58: "Another dreamer, an Englishwoman named Anita Roddick, is shaking up the cosmetics business in profound ways"; Deborah Stead, "Secrets of a Cosmic Cosmetician," *New York Times*, 23 September 1990, 25: "Ms. Roddick regularly treks to remote regions of Nepal and Brazil in search of natural oils, muds and methods"; and "Cosmetics Maker Adopts Renewable-Energy Plan," *New York Times*, 29 May 1992, D3: "The British cosmetics maker Body Shop International P.L.C., which prides itself on not using laboratory animals and is an active campaigner on environmental issues, will now use windmills for its power needs." In a column subtitled "Away From Home with Anita Roddick," Trish Hall profiles the company founder, rehashing the origin stories, reiterating the U.S. expansion plan, and noting a recent award from the N.A.A.C.P., an invitation to teach at Stanford, and a guest stint along with Anita Hill and Gloria Steinem at the 20th anniversary celebration of 9 to 5, the National Association of Working Women. See Trish Hall, "Striving to Be Cosmetically Correct," *New York Times*, 27 May 1993, C1, C8. More free advertising occured in 1993 in an article on The Body Shop's project to raise awareness about AIDS. See Clifford J. Levy, "Body Shop Starting a Campaign on AIDS," *New York Times*, 28 September 1993, D4.

16. See John Entine, "Shattered Image: Is The Body Shop Too Good to Be True?" *Business Ethics*, September 1994. Press releases and newspaper articles referred to Entine as "Emmy Award-winning producer John Entine, a veteran of ABC's '20/20' and 'Prime Time Live.'" Apparently not discouraged by The Body Shop's 32-page rebuttal, on August 31, Entine declared, "This story deserved to be told—I have told it." See Michael Swain, "I Stand by My Story on Anita, Gordon, and The Body Shop," *Evening Standard*, 31 August 1994, 16. The company appeared to take a heavy blow when the Franklin Research and Development firm, the largest independent firm to specialize in "socially responsible investing" sold all of its 50,000 shares of The Body Shop International in response to leaks about the content of Entine's article, causing corporate stocks to plummet. On August 25th, it was reported that Body Shop stock fell 9.5% from 242 pence, or $3.63 a share, to close at 219 pence. See Dirk Beveridge, "Uproar Threatens Body Shop Stock," *San Francisco Chronicle*, 25 August 1994, D1; and Michael Clark, "Body Shop Slides Further on Growing Concern Over U.S. Report," *London Times*, 31 August 1994, Business section. After an exchange of insults and impugning of integrity on all sides in the press, the furor appeared to subside slightly, leading to new headlines such as "Shares Rally for Body Shop." See *New York Times*, 3 September 1994, A36. Only last year, the Body Shop won a libel

suit and was awarded significant damages against the producers of a British television documentary that made similar allegations to Entine's. Obviously, the corporation is entering a new era of litigation and public relations strategies.

17. An article in 1991 detailed stiff competition from Estée Lauder and the Limited while an article in 1992 mentions even smaller but persistent competitors such as H^{2}O Plus. In 1993, a feature article mentions "fears of market saturation." See Eben Shapiro, "The Sincerest Form of Rivalry," *New York Times*, 19 October 1991, L35, 46; Valerie Reitman, "Success of Body Shop Natural Cosmetics Attracts Imitators to the Scent of Profits," *Wall Street Journal*, 4 September 1992, B1, 2; Judith Valente, "Body Shop Has a Few Aches and Pains," *Wall Street Journal*, 6 August 1993, B1, 3.

18. Noting that the U.S. has "traditionally been the graveyard of British retailers," Roddick details the care with which this new market was approached, stressing that The Body Shop had more than 200 stores in 33 countries around the world before the first Body Shop opened in the U.S. in the summer of 1988. Roddick, *Body and Soul*, 131.

19. See Barbara Toman, "Body Shop May Need Ads to Sell Pineapple Facial Wash in U.S.," *Wall Street Journal*, 15 March 1989, B6.

20. Roddick, *Body and Soul*, 137.

21. I am using the text that appears in an ad in the August 1993 *Vanity Fair*.

22. Roddick, *Body and Soul*, 25.

23. Ibid., 165.

24. Ibid., 171.

25. See, for example, the discussion of Kayapo and other indigenous people's video projects in Ella Shohat and Robert Stam, *Unthinking Eurocentrism: Multiculturalism and the Media* (New York: Routledge, 1994), 32–7; Terence Turner, "Visual Media, Cultural Politics and Anthropological Practice," *The Independent* (January/February 1991): 34–40; and Faye Ginsburg, "Indigenous Media: Faustian Contract or Global Village?" *Cultural Anthropology* 6 (1991): 92–112.

26. Roddick, *Body and Soul*, 209.

27. Vron Ware, *Beyond the Pale: White Women, Racism and History* (London: Verso, 1992), 244.

28. Roddick, *Body and Soul*, 18.

29. Meaghan Morris, "Things To Do With Shopping Centres," in *The Cultural Studies Reader*, ed. Simon During (London: Routledge, 1993), 316. Also published in *Grafts: Feminist Cultural Criticism*, ed. Susan Sheridan (London: Verso, 1988), 193–225.

30. Robert David Sack, *Place, Modernity, and the Consumer's World: A Relational Framework for Geographical Analysis* (Baltimore, Md.: Johns Hopkins University Press, 1992), 3.

31. Ibid.

The Invisible Giant
Cargill and Its Transnational Strategies

Brewster Kneen

Established in 1865, Cargill is the largest private company in the United States. It started out primarily as a regional grain merchandizer in Minnesota (where it is still headquartered); it now describes itself as the largest agricultural commodities trader in the world, with global sales of $51 billion in 1994–1995 and a daily profit of $2 million after taxes.[1]

Yet few people are aware of Cargill's global reach, not even many of its own employees. In Memphis, Tennessee, the casual visitor to the office of Hohenberg Bros. would be hard pressed to know not only that it was the office of one the top five cotton trading companies in the world but also that it was a Cargill subsidiary.[2] In many towns and cities, the local Cargill office is housed in a nondescript building outside the main business district, with little indication of the company's presence except on the lobby plaque listing the building's tenants. This low profile is no accident. As Kerry Hawkins, president of Cargill Ltd (Canada) once put it, "Our experience is if you're too big, people don't want to do business with you."[3]

And Cargill is big. It employs some 72,700 people worldwide in 800 locations in 60 countries in more than 50 leading lines of business including corn, salt, peanuts, cotton, coffee, road transport, river-canal shipping, molasses, livestock feed, steel, hybrid seeds, rice milling, rubber, citrus, chicken, fresh fruits and vegetables, beef, pork, turkey and flour milling. Cargill is the world's largest producer of malting barley; the largest oilseed processor; and the second largest producer of phosphate fertilizer.[4]

Subsidies, Subsidies

Cargill's fortunes appear to have depended to a surprising extent, given the corporate ideology of free enterprise, on the major export subsidy programmes of the US government, particularly over the past 50 years.[5] Immediately after the Second World War, programmes of the UN Relief and Rehabilitation Agency and the Marshall Plan moved mountains of grain as aid to Europe. US wheat and flour exports jumped from

48 million bushels in 1944 to 504 million in 1948. Grain companies, including Cargill, stored and delivered grain—for a fee—on behalf of the US government.

By the early 1950s, however, domestic food production in Europe began to rise to replace imports. The dumping of US grain was no longer welcome foreign aid, but unwelcome competition and an obstacle to the European goal of self-sufficiency in food. The response of the United States government, under heavy pressure from grain companies, was to subsidize the export of grain to countries outside of Europe under Public Law 480—the Agricultural Trade Development and Assistance Act, known as "Food for Peace"—which was passed in July 1954. As W. G. Broehl writes in his corporately-sponsored history of Cargill:

> PL 480 combined and extended the use of surplus agricultural products for the further-ance of foreign policy goals … The funds could also be used to develop new markets for United States farm goods … That it was a boon to the American grain traders goes with-out saying.[6]

Cargill has always been a major beneficiary of PL 480 finance. Between 1955 and 1965, Cargill's US grain exports increased 400 per cent, with sales rising from $800 million to $2 billion. By 1963, Public Law 480 had generated revenue for Cargill of $1 billion. In addition, between 1958 and 1968, Cargill received some $76 million for stor-ing grain, often in leased, publicly-owned terminals or terminals built with public funds.

Cargill has been quick to capture other subsidies as well. In 1985, the US Congress passed the Export Enhancement Programme (EEP) of the Food Security Act to bol-ster crop exports and help beleaguered US farmers. Under the EEP, eligible countries are designated each year by the US Secretary of Agriculture. Individual sales are then negotiated between the eligible country (or its designated agency) and a trading com-pany on the basis of the subsidy available at the time for that particular country. The subsidy is then paid to the company making the deal.

From 1985 to early 1992, the US government doled out $4.26 billion to 95 corporate trading companies under the EEP, with Cargill receiving some $800 million of this. In 1987, wheat sales under the EEP to China alone reportedly netted Cargill subsidies of $2 million.[7] Commenting on the EEP, the *New York Times* concluded:

> The Agriculture Department's $40 billion campaign to bolster crop exports, begun a decade ago to help beleaguered farmers, has instead enriched a small group of multi-national corporations while doing little to expand the US share of the world's agricul-tural markets … An examination of the subsidy programmes highlights the symbiotic relationship between one of the biggest and least scrutinized federal departments and some of the politically influential companies it regulates.[8]

Other publicly-funded programmes which have benefited Cargill and other grain processors and merchants in the name of US market share and global competitiveness are channelled through non-profit industry foundations and associations so that they are relatively invisible to the public.

Moulding Policy

Cargill has a full array of highly sophisticated lobbying styles to manipulate govern-ment policy and programmes to its advantage. Its reputation in the grain trade for doing so is extensive: as an executive in a competitor company said, "The big ones don't get that way by waiting around for something to happen."[9]

A prime mechanism is the revolving door of public service: (usually) senior Cargill executives take leave of Cargill for a stint in government advisory and policy positions, returning to the company when their mission is accomplished. The career of William R. Pearce, who retired as Cargill's vice-chair in 1993, is illustrative. In 1973, Pearce left Cargill to join the Nixon administration as deputy special representative for trade ne-gotiations, steering a trade bill through Congress that, in Cargill's own words, "shaped international trade policy".[10] Pearce rejoined Cargill a year later in 1974.

Cargill employees or ex-employees have taken up key posts in the US Department of Agriculture (USDA) and in the US negotiating team for the recent GATT Uruguay Round. Such is the extent to which Cargill employees have rotated through positions at the USDA that one government investigator has called the practice "structural cor-ruption".[11]

The next level of lobbying activity takes place through the myriad trade associ-ations that represent a commodity or processing interest, such as turkey growers, flour millers, soybean processors, peanut growers or the feed industry (there are 77 pages in one directory of US agricultural associations with several per page). While many of these associations present themselves as producer organizations and claim to speak on behalf of farmers, organizations like the "Western Canadian Wheat Growers" and the "Western Canadian Barley Growers" are actually financed by corporations and speak for their corporate backers. Cargill has organized similar groupings in countries where it is seeking to establish a presence: in India, for example, farmers to whom it has sold hybrid corn have been encouraged to speak on behalf of the company.

In recent years, Cargill has also developed effective grassroots lobbying techniques to enhance its higher level activities and achieve favourable business climates at the local level. The Cargill Community Network (CCN), for example, is the name of a grassroots programme "aimed at improving Cargill's reputation and success in com-munities where it is doing business." The CCN is "designed to help win Cargill's pub-lic-policy objectives at every level of government" by spreading the word that Cargill is "a solid corporate citizen" while "building a reservoir of community goodwill that ensures we have friends when we need them."[12] From a computer database, network members receive information on state and national issues as well as identification of their state and national legislators; in some cases the network also negotiates group memberships "with leading business organizations."

Establishing Beachheads

Nurturing such networks is key to Cargill's operations around the world. Indeed, its success as a global company—and, in particular, its ability to enter new product

markets in many different localities—has depended on its capacity for identifying key political actors and politically-appropriate business openings. James R. Wilson of Cargill Technical Services in the UK recently described Cargill's approach to starting a business in a new country:

> Cargill speaks of beachheads. Much of business strategy has its origins in military strategy. Historic product-line beachheads for the company have been hybrid seeds (primarily corn), commodity export marketing and animal feed milling. The strategy has been: create the beachhead with inputs of capital, technology and a management nucleus: get the cash flow positive; re-invest the cash flow and expand the beachhead … The company generally insists on majority ownership in beachhead companies because it needs to be clear who is responsible for the management of an individual company.[13]

Hybrid seed has proved particularly attractive as a "beachhead product" because it requires virtually no capital investment. In Tanzania, for example, Cargill's seed business has 24 staff, most of whom are involved in seed production. Four or five of them, however, "bounce around the country on dirt bikes setting up a dealer network" and selling and delivering seed in small quantities of one to ten kilogrammes. Managers, meanwhile, work with "contract seed growers who run much bigger farms than most of their customers."[14] The hybrid seed business is then used as a "Trojan Horse" to create dependency among farmers upon Cargill's "crop inputs" of fertilizers and advice; as a result, they eventually become indebted suppliers of commodities, either for trade or processing. Besides Tanzania, Cargill has used hybrid seeds to establish itself in Argentina, India, Pakistan, Zambia, Zimbabwe, South Africa and Malawi—all of which have the potential to become major grain and oilseed growing regions.

Elsewhere, other products have been used. In Indonesia, for example, Cargill scout Kees Nieuwenhuyzen recommended in 1970 that Cargill start a feed company and a small chicken breeding hatchery. By 1982, Cargill's operations had grown to two feed mills, three chicken breeding farms and a hatchery with an annual production of 4.5 million broiler and layer chicks. Hybrid seed was subsequently added to the company's products, with the Indonesian government subsidizing 30 per cent of the costs of the seeds to farmers. James Spicola, a former president of Cargill, summarized the strategy:

> We start out with a reasonably small capital investment in a field to which we think we can bring some expertise and technology and management, then grow the business from there. We reinvest the profits and move into other opportunities as the situation develops … We've found that our welcome to the country is much more productive on a long-term basis if we've started small and grown.[15]

Stopped in Its Tracks

Despite its global reach and power, however, Cargill does not always get its own way. In Japan, it has consistently been hindered, if not blocked outright, by Japan's five large trading houses, known as the *Zaibatsu*. Cargill tried to get into feed milling in Japan, but the government would only permit them to buy an existing plant. When it

tried to do so, all the mills in Japan agreed among themselves not to sell to Cargill. After US government intervention on Cargill's behalf, the Japanese government eventually gave Cargill permission to build a new plant—but, unlike other importers of feedstuffs, required Cargill to pay duty on its imports. Without duty-free imports, the plant could not compete in the Japanese market and Cargill was forced to lobby again for the import duties to be lifted. This was eventually agreed, but the company has still been unable to expand its operations or become a major player in the Japanese feed market.

In addition, Cargill's failure to understand Japanese consumer tastes and work practices have also caused it major problems. In 1991, for instance, it announced that it was to build a beef "further-processing" plant to "enable Cargill to serve the expanding appetite of Japanese consumers for redmeat products as Japan liberalizes its meat-import laws." Barely two and a half years later, Cargill halted its operation and sold the processing plant to Nippon Meat Packers at a reported loss of $10 million. Industry insiders say that the venture failed because Cargill failed to understand the Japanese food distribution system, thinking instead that what worked in the US could be simply duplicated in Japan. However, Japan's food service industries and supermarkets require frequent, small-lot deliveries, demands which Cargill could not meet. Nippon Meat Packers, unlike Cargill, has developed a system that gets customized beef orders to restaurants and supermarkets across most of Japan within 24 hours of being imported.[16]

In India, Cargill's global reach has been curtailed through the opposition of "powerless" peasants. In July 1988, the Indian government approved a "New Policy on Seed Development", reducing the duty on imported seeds from 95 per cent to 15 per cent. Cargill began to implement its 1983 decision to enter the seed business in India by setting up a joint venture company—Cargill Seeds India—with Tedco, a subsidiary of Tata, one of India's largest corporations. An office was established in Bangalore and in early 1993 Cargill started to build a seed processing factory on a 32-acre site at Bellary, 300 kilometres north of Bangalore. The facilities were to include an administration and seed technology training centre "to develop modern agriculture", and were scheduled to begin production in October 1993. The presence of Cargill in India, coupled with the push to conclude the Uruguay Round of the GATT negotiations, however, ignited a popular campaign against the company. On the morning of 13 July, local farmers gathered at the Cargill site, demolishing the partially-completed facility with their bare hands.

Resisting the Giant

Powerful though Cargill appears from its balance sheet and its political contacts, there are clearly many things that it cannot do. Cargill and other transnational corporations have the wealth, skill and political leverage to outflank or overpower virtually any organization that attacks them head-on in a game which is rigged in their favour. They cannot, however, force people—either farmers or the general public—to play their game.

The Japanese *Zaibatsu* have practised one line of resistance to Cargill, banding together like warlords to defend "their" territory. The farmers of India, in their numbers, have manifested another. The growing refusal of consumers to eat highly-processed food that has travelled from a centralized production facility and the rejection by increasing numbers of farmers of growing industrial monocultures are still others.

Around these old affirmations and new beginnings, social movements and their allies are making common cause worldwide to lay the grounds for socially-just and environmentally-sound alternatives to the global production systems which Cargill exemplifies. New forms of social organization are emerging which thrive on and generate diversity and inclusivity. It is hard to imagine a place for Cargill in such communities.

NOTES AND REFERENCES

1. *Minneapolis Star-Tribune*, 1 Sept 1985; *Wall Street Journal*, 24 July 1995. See also Sewell, T., *The World Grain Trade*, Woodhead Faulkner, 1992.

2. Hohenberg Bros. operates in some parts of the world as Ralli Bros. & Coney.

3. *Ontario Farmer*, 4 Oct 1989.

4. In the United States, Cargill is the third largest beef packer and the fourth largest pork slaughterer; the fourth largest cattle feeder; the sixth largest turkey producer; and the third largest flour miller (19 mills). See Cargill handout, Sept 1994.

5. I have to say "appear" because there are no consistent and reliable statistics to draw upon. Although aggregate figures for trade and aid are available from government sources, they do not give, and are not allowed to give, any indication of corporate shares. In addition, private corporations are under no obligation to reveal financial results; what numbers they give suit their own purposes. I am left having to observe correlations and draw inferences.

6. Broehl, W. G., *Cargill—Trading the World's Grain*, University Press of New England, New Hampshire, USA, 1992, p. 778.

7. *Globe and Mail*, 13 Jan 1987. In January 1994, the US granted a $65-per-tonne EEP subsidy to grain exporters to sell nearly one million tonnes of US wheat to China. The subsidy, larger than subsidies on grain sales to Africa or the ex-Soviet republics, enabled grain companies to sell grain at about half the US domestic price. See *Globe and Mail*, 6 Jan 1994.

8. Baquet, D. with Henriques, D., *New York Times*, 10 Oct 1993.

9. Ackerman, F. J., Louis Dreyfus Canada Ltd.

10. *Star Tribune*, 29 June 1993: *Cargill News*, June 1993.

11. Ahlberg, B., "Cargill: The Invisible Giant", *Multinational Monitor*, July–Aug 1988, pp. 36–39.

12. *Cargill News*, Nov 1993.

13. Wilson, J. R., "A Private Sector Approach to Agricultural Development", paper presented to Salzburg Seminar, Jan 1994.

14. *Cargill News*, Nov 1991.

15. Corporate Report Minnesota, Aug 1987.

16. *Star Tribune*, 27 Nov 1993.

Treading Lightly?
Ecotourism's Impact on the Environment

Martha Honey

Nestled in a national park on St. John in the U.S. Virgin Islands, Maho Bay Camps, 114 platformed tents hidden in deep foliage, overlook the turquoise-blue bay. Three miles of winding wooden walkways, designed to protect the growth and minimize soil erosion, connect the tents to the beach, communal toilets, cold water showers, and the large, gazebo-shaped dining-cum-meeting room. Maho Bay, the oldest, largest, and best-known property built and owned by New York developer Stanley Selengut, is one of the world's most famous and financially successful ecotourism resorts. Built in the 1970s, more than a decade before ecotourism gelled as a concept, this site-sensitive construction was both the cheapest and the least controversial technique, given the land's protected status. While the relatively rustic tents are billed as appealing to "vacationers of a Sierra Club bent," Harmony Resort, Selengut's "off the grid" condominium complex located just above the tents on the edge of the national park, has been ranked as the world's top "ecosensitive honeymoon resort."[1] These luxury villas are built almost entirely of recycled materials (although not from St. John): The roof shingles, for instance, are recycled cardboard and cement, the bathroom tiles are made from crushed light bulbs, and the decks are recycled newspapers. Each condo relies on solar and wind power, captured rainwater, and has a computer to monitor how much electricity and water guests use.

Today, the Maho Bay tented camp and Harmony condos have become among the most popular destinations for ecotourists from the United States. They operate at nearly 90 percent occupancy, yet Selengut boasts that he spends no money on advertising. Bookings come from repeat customers and word-of-mouth referrals and from garnering more good media coverage and awards than any other ecotourism project. By 1993, the tented camp was taking in $3 million per year on an initial investment of $750,000. "It's almost like stealing," Selengut told *Forbes* magazine.[2]

Just a few islands away, in Cuba, a trickle of U.S. residents challenge the travel ban and stay at the state-of-the-art Moka Ecolodge, adjacent to Las Terrazas, one of Cuba's

most successful post-revolutionary rural communities. Located in the lush tobacco and timber hills of Pinar del Rio province, Moka was the brain child of Osmany Cienfuegos, tourism minister, architect, and close confidant of Fidel Castro. In 1990, as the island's economy plunged into its worst-ever economic crisis following the collapse of Cuba's economic and political patron, the Soviet Union, Minister Cienfuegos conceived of the project as a way of providing a steady income for Las Terrazas in keeping with the community's ecological and social goals. Las Terrazas, whose red-tile-roof apartments are built on terraces around an artificial lake, was founded in 1968 when approximately 70 scattered farm families, charcoal makers, and construction workers elected to move together to gain access to schools, health care, and other amenities. From its inception, Las Terrazas was an experiment in sound environmental and human management, and its progress has been carefully nurtured and monitored by government officials, sociologists, scientists, and environmentalists. Most of the adults in this 850-member village are involved in reforestation work in and around the Sierra del Rosario tropical mountain forest that the United Nations Educational, Scientific, and Cultural Organization declared a biosphere reserve in recognition of its unique ecosystem.

Like Maho Bay's tented camp, Moka Ecolodge is connected to a national park and has a number of innovative and environmentally sensitive architectural features: No forest was cut or hillside razed in building the 26-room lodge; a small brook runs through the lobby; solar panels provide some of the electricity; and some of the food served was grown in hydroponic, organic gardens. In contrast with the privately owned Maho Bay, Moka Ecolodge was financed and built by the government and is owned and run by the local community, which is scheduled to repay the $6 million investment over a 15 to 20 year period. Ecotourism now provides employment for approximately 150 Las Terrazas residents, either in the lodge itself, as guides in the reserve, or in the several new community tourism projects, including a bakery, craft workshops, a coffee shop, and a small restaurant. Forty percent of the profits from the hotel go into a community development fund overseen by the neighborhood committee, and another 10 percent go directly to the community's health clinic, which also grows and uses herbal medicines. In addition, 60 percent of the profits from the various community businesses go into the development fund. Ecotourism earnings also have helped finance Las Terrazas' schools, day-care center, and a community-based radio project.[3]

Defining Ecotourism

Ecotourism is defined most succinctly by the Ecotourism Society as "responsible travel to natural areas that conserves the environment and improves the well-being of local people." There are other variants of this popular definition. Mexican environmentalist Héctor Ceballos-Lascuráin, one of several people who claim to have first coined the term, describes ecotourism as "a mode of ecodevelopment that represents a practical and effective means of attaining social and economic improvement for all countries." The definition used by the ecotourism program of the International Union

for the Conservation of Nature (or World Conservation Union) (IUCN) is "environmentally responsible travel and visitation to relatively undisturbed natural areas, to enjoy and appreciate nature (and any accompanying cultural features—both past and present) that promotes conservation, has low visitor impact, and provides for beneficially active socioeconomic involvement of local populations." In all these definitions, ecotourism is distinct from "nature," "adventure," "wildlife," and virtually all other types of tourism because it focuses not simply on the type of leisure activity, but on tourism's impact and the responsibilities of both the tourist and those in the tourism industry (such as tour operators or lodge owners).

In sum, ecotourism is travel to fragile, pristine, and usually protected areas that strives to be low-impact and (usually) small-scale. It helps educate the traveler; provides funds for conservation; directly benefits the economic development and political empowerment of local communities; and fosters respect for different cultures and human rights.

Origins and Growth of Ecotourism

Today, ecotourism, or at least a revamped version of nature and wildlife tourism, is the core of many developing countries' national economic development strategies and conservation efforts. At international conferences and in environmental and travel literature, the choice of countries seems endless: Bolivia, Belize, Dominica, Mongolia, Vietnam, Cambodia, Bhutan, Fiji, Indonesia, Senegal, Namibia, Madagascar, Uganda, and Zimbabwe are among the countries in Asia, Africa, and Latin America now on the ecotourism bandwagon. In several countries, nature-based tourism mushroomed into the largest foreign exchange earner, surpassing bananas in Costa Rica, coffee in Tanzania and Kenya, and textiles and jewelry in India.

Major international conservation organizations, including IUCN, the Nature Conservancy, Audubon Society, Conservation International, Africa Wildlife Foundation, Sierra Club, and World Wildlife Foundation, have initiated ecotourism-linked departments, programs, studies, and field projects, and many are conducting nature tours, adventure tours, or ecotours for their members. International lending and aid agencies pump millions of dollars into projects with ecotourism components. The Ecotourism Society (TES), a small, energetic nonprofit organization based in Vermont, includes among its 1,200 paid members travel industry representatives, government officials, academics, and consultants in more than 75 countries.

Today, virtually every country in the world is marketing some brand of ecotourism. Tourism has become a big business: As a $4 trillion-plus annual industry, it is the world's number one employer, and it vies with oil as the world's largest legitimate business. If it were a country, it would have the second-largest economy, shadowed only by the United States. The world's biggest generator and beneficiary of tourism is the United States, accounting for about 15 percent of total spending.

Sound Ecotourism vs. Ecotourism "Lite"

Throughout much of the 1990s, ecotourism has been trumpeted as a way to provide resources to help protect wildlife and fragile ecosystems, a development tool for rural communities living around parks and other protected areas, and a greener, cleaner alternative to the ills of conventional mass tourism. In reality, the picture is more complex. For instance, held up to this multilayered definition of real ecotourism, the two Caribbean resorts Maho and Moka show both strengths and shortcomings. While Maho Bay has helped to popularize the concept of ecotourism and is creatively pushing the perimeters of ecolodge design, it has paid little heed to other ecotourism principles involving the local community, conservation, and tourist education. Maho Bay employs few West Indians (most of the staff are young, single North Americans working for low wages in exchange for a stint in the tropics), does not promote local crafts in either its decor or gift shop, and has done little for the island in terms of financial contributions to environmental or social welfare projects. "These are green lodges, not real ecotourism," comments Joshua Reichert, director of the Pew Charitable Trusts' environmental program, who attended an ecotourism workshop at Maho Bay.[4]

Moka Ecolodge, in contrast, is clearly providing jobs and badly needed income to the local community of Las Terrazas and is generating additional resources to help protect the near-by biosphere. This state-financed lodge is too costly and cumbersome, however, to be easily replicated elsewhere on the island, and so far there has been scant foreign investment in Cuba's ecotourism sector.

Most importantly, however, visiting Moka presents a tough political choice for U.S. residents. The most serious impediment to the success of Moka and Cuba's other ecotourism projects, contends Tourism Minister Osmany Cienfuegos, is the U.S. embargo that has been in place for nearly four decades and carries the penalty (never fully enforced) of large fines and up to 10 years in prison for unauthorized visits to the island. "If the blockade were lifted, ecotourism would jump dramatically with the influx of North American tourists," Cienfuegos contends.[5] In pre-revolutionary Cuba, 95 percent of the tourists came from the United States; today, as the rest of the world does business with Cuba and tourist arrivals have tripled this decade, only a few thousand U.S. travelers brave the embargo or succeed in getting special U.S. Treasury Department licenses allowing educational or humanitarian visits to the island.

While, like Maho and Moka, many projects around the world may be missing a few of the pillars of sound ecotourism, others amount to little more than green packaging or labeling of conventional or mass tourism. In Costa Rica, Papagayo, a $3 billion mega-resort project that will include shopping centers, two golf courses, and a polo field—is officially called an "ecodevelopment." "Everyone calls themselves 'ecodevelopments,' but Papagayo is a city," retorts Costa Rican environmental activist Leon Gonzales.[6] Along Mozambique's southern coast next to South Africa, a U.S. developer is building "an $800 million ecotourism paradise" including a floating casino, a golf course with hippos in the water hazards, Club Med-style hotels, and imported wild game and San (popularly but derogatorily referred to as Bushmen) from the Kalahari Desert as additional "tourist attractions," while 10,000 local subsistence farmers and fishermen are to be moved out. Marketed as a "beast and beach" holiday package, the

project's wildlife reintroduction plan "reads like a cargo manifest for Noah's Ark," according to the *New York Times*.[7] In Nepal, tourists can avoid climbing the mountainous terrain via what is marketed as "ecotourism of the future"—helicopter treks to the summits of various mountains.[8] Even Walt Disney is capitalizing on the traveling public's desire to "go green" with an ecotourism-type theme park, Animal Kingdom, which has transformed a central Florida cow pasture into an African savanna. Now the public can "go on safari" without leaving the shores of the United States.[9]

Much of what the big players in the tourism industry sell as green tourism is known as "ecotourism lite"—minor environmentally friendly, cost-saving measures (such as not washing sheets and towels each day) or "add-ons" (a half-day hike into a rainforest or bird watching, for instance) to conventional vacations. Mainstream ecotourism, or ecotourism lite, is often described with catchy phrases such as "treading lightly on the earth" and "taking only photos, leaving only footprints," and its advertisements and brochures contain buzzwords such as *quiet, pure, lush, unspoiled, bio-* and, of course, *eco-* and *green.* In the mid-1990s, the World Travel and Tourism Council (WTTC), whose members include the directors of airlines, hotel chains, cruise lines, and major tour agencies, launched its "Green Globe" logo program designed to promote companies "committed to environmental improvement." As originally outlined by WTTC president Geoffrey Lipman, for as little as $200 a travel and tourism company could purchase the right to use the Green Globe logo in all its literature, giving the impression it was "going green." However, there was no oversight to ensure the company had instituted environmentally sound practices.[10]

While big players in the industry try to package themselves as green, on-the-ground ecotourism frequently involves conflicting control of natural resources and tourism dollars, struggles over local versus international ownership, and public policy versus private enterprise debates. However, the most contentious and overlooked part of the ecotourism equation is typically involving, benefiting, and respecting the rights and culture of the local communities.

Lessons from Kenya

East Africa is renowned as the home of both mankind's earliest ancestors and some of the world's finest wildlife game parks. It is also one of the places where the concept of ecotourism first evolved. Kenya, in particular, was the site of the continent's earliest government experiments with applying ecotourism principles to several national parks and reserves. Today, virtually every country in East and southern Africa is aggressively competing in nature tourism and ecotourism, and tourism has surpassed coffee as the number one foreign exchange earner in both Kenya and Tanzania. In many ways, East Africa serves as both a beacon light and a warning light for community-sensitive ecotourism policy and practices.

Under colonialism, Africa's national parks were originally created as exclusive domains for white hunters, scientists, and tourists. Hundreds of thousands of rural poor were forcibly moved (some chiefs were tricked with phony "treaties") and relocated to the parks' perimeters. The colonial philosophy, initially adopted by post-colonial

governments, was that wildlife had to be protected from the local Africans with fences, fines, and fire-power. In fact, pastoralists such as the Maasai in Kenya and Tanzania had evolved elaborate systems for living in harmony with wildlife; it was only with the arrival of European hunters and settlers that the rapid extermination of African game began. Despite this reality, colonial park policy typically barred Africans from hunting (or even having a gun), collecting grasses, firewood, or water, or visiting sacred and burial sites inside national parks. Those living on the parks' peripheries received little or no benefit from the parks, wildlife, or tourism.

Resentment grew, as did resistance borne of necessity, including illegal hunting, fires, grazing, and collection of firewood inside the parks and reserves. Despite the escalating military tactics by park guards—endorsed and sometimes financed by international conservation organizations such as the World Wide Fund for Nature—poaching within parks of elephant, rhino, and other wildlife soared sharply in Kenya and Tanzania during the 1970s. Faced with this growing clash between people and parks, scientists, park officials, and environmental organizations began to rethink the protectionist conservationist model and to argue that threatened species and ecosystems would survive only if those people living nearest them benefited financially from both the parks and tourism. Thus, the origins of ecotourism can be traced, in part, to East Africa, where in the late 1960s and 1970s conservationists began to posit a "stakeholders" theory of conservation: that those living on their perimeter should receive direct benefits from wildlife and tourism. As scientist David Western, the on-again, off-again director of Kenya Wildlife Service and the first president of the Ecotourism Society, writes,

> Conscientious concerns for nature were soon extended to local (usually indigenous) peoples. Implicit in the term [ecotourism] is the assumption that local communities living with nature can and should benefit from tourism and will save nature in the process.[11]

It was in Kenya that Africa's first official experiments with this new approach began. The imperative to find a balance between people and parks had been great in Kenya because nearly all of its 50-plus national parks and reserves are small, incomplete ecosystems. Up to 75 percent of the wildlife either live in or migrate into the surrounding buffer zones where they destroy crops, harm livestock, and on occasion, kill people. In 1961, at the time of independence, Kenya's new government agreed to put two of the most popular tourist destinations, Maasai Mara and Amboseli game reserves, under the control of local county councils, which subsequently began receiving revenue from both park entrance fees and hotel and other tourism facilities inside these reserves.

Over the decades, both reserves have gone through bureaucratic permutations and a variety of experiments with community-run tourism projects and revenue-sharing schemes. These pioneering ecotourism experiments meant that sizable numbers of Maasai pastoralists living around the Mara and Amboseli received employment as hotel staff, drivers, guides, and park guards and rangers and that entrance fee revenues and a percentage of hotel profits supported local community projects. While poaching continued elsewhere—between 1975 and 1990 Kenya's elephant population dropped 85

percent and rhinoceroses by 97 percent—poaching was stabilized around Amboseli and Maasai Mara.

However, despite high income from tourism and low incidence of poaching, these two experimental parks are in trouble. The distribution of tourism profits has long been plagued with corruption and cronyism, enriching a handful of powerful politicians and businessmen. "The issues have always centered around money, and how the money is spent," commented one Maasai dissident. Today, few community projects are visible: The roads are in terrible disrepair and conditions in these most popular reserves are degraded by overcrowding and over-development.[12] These problems have been compounded by an overall decline in tourist numbers to Kenya, due to political instability, massive rains, and the country's declining international reputation.

The deterioration of Kenya's premier national parks and reserves has led to the rapid increase of private wildlife ranches. Most ranches are owned by white settler families who market an elegant but colonialist "Out of Africa" experience under the banner of ecotourism, catering to a very upscale international clientele. They have fenced off their estates to make wildlife parks: Some are involved in breeding endangered species such as the black rhinoceros or Rothchild's giraffe, others care for orphaned or wounded animals, and still others offer specialties such as bird watching or fishing. Many of these ranch owners are active in the Ecotourism Society of Kenya (ESOK), the continent's first such organization intended to set standards and promote ecotourism principles and practices.

Much of this is ecotourism lite, however: These ranches have carefully cultivated relations with powerful politicians and international conservation organizations, the travel press, and film makers, and are doing little revenue sharing with either local communities or Kenya's national treasury. According to environmental consultant Robert Hall,

> These owners cry about their huge expenses to maintain their fences and protect their pet rhinos but the truth is more complex. These guys have their own air strips, and no one, and I mean no one, knows how many people come and go during a year. Their charges are generally at least $250 to $600 per person per night. And what does the Treasury receive? Nada.[13]

Many of these settler farms have expanded into wildlife conservation and tourism in hopes of preserving and protecting their sizable tracks of land from government or squatter takeovers. Fundamentally, these private reserves are an attempt to maintain family wealth and a lifestyle from a bygone era "under the guise of conservation and ecotourism," says Maasai activist Meitamei Ole Dapash.[14]

The Future of Ecotourism

Some experts have pronounced ecotourism dead, passé, or hopelessly diluted. However, amid the superficiality, hype, and marketing, there are excellent examples around the world of dedicated people, vibrant grassroots movements and struggles, and much creativity and experimentation. Although real ecotourism is indeed rare and usually

imperfect, it is still in its infancy, not on its deathbed. Ecotourism has succeeded in fulfilling some of its stated goals: Most ecotours are educational for the tourist and many ecotourism projects are lower impact than conventional tours and are providing expanded benefits for conservation and environmental protection. The long-term challenge is to find ways to maintain the rigor and multidimensional qualities of genuine ecotourism while widening it beyond individual projects and making it integral to the concept of tourism in general.

The path toward a more planet-friendly tourism is paved with pitfalls. At present, ecotourism is a set of interconnected principles whose full implementation presents multilayered problems and challenges. Among the most pressing and only partially analyzed issues are: how to make poor, rural communities equitable stakeholders in parks and ecotourism; how to ensure, in this era of free trade and economic globalization, that locally owned enterprises and national capital can compete with strong foreign companies; how to balance a developing country's need to earn more foreign exchange by increasing tourism numbers with the need of fragile ecosystems for low-impact, small-scale tourism; how to allow, as ecotourism implies, exploration of pristine and uncharted areas of the Earth that are often home to isolated and fragile civilizations; and how to set up independent and competent mechanisms for monitoring, evaluating, and setting standards throughout the ecotourism chain.

As the millennium draws to a close, ecotourism has opened a bold new direction in how to explore the world. Whether ecotourism matures into adulthood, gains permanence, and becomes the predominant way we travel and interact with our physical and cultural environment in the 21st century depends on myriad factors. One step toward ensuring ecotourism's survival is helping to build a more discriminating and informed traveling public. The good news is that today's socially conscientious traveler can, with a bit of research and advance planning, find excellent ecotourism projects in nearly every corner of the world. Despite the constraints, there are growing numbers of travelers walking the path of socially responsible and environmentally respectful tourism.

NOTES

1. "Clipboard," *Travel Weekly*, 6 June 1994.

2. S. Oliver, "Eco-profitable," *Forbes* 153, no. 13 (1994).

3. Osmany Cienfuegos, tourism minister, as well as local villagers, interviews with the author, Moka Ecolodge, Cuba, 1994; and Karen Wald, Cuban-based American journalist, letter to the author.

4. Joshua Reichert and Stanley Selengut, interviews with the author, Maho Bay, 1998.

5. Osmany Cienfuegos, tourism minister, interviews with the author, Moka Ecolodge, Cuba, 1994.

6. J. Brown, "Officials, Tourism Leaders Dispute Papagayo Project," *The Tico Times*, 21 January 1994, 13.

7. D. McNeil, "Maputo Elephant Reserve Journal: Thinking Big ($800 Million) to Rescue Big Game," *New York Times*, 7 March 1996.

8. I. Muqbil, "German Tourism Activist Sounds Warning on Bogus 'Ecotourism,'" *Bangkok Post*, 7 April 1994, tourism supplement page 3.

9. M. Navarro, "New Disney Kingdom Comes with Real-Life Obstacles," *New York Times*, 16 April 1998; and J. Nordheimer, "Disney Goes Live with Its Newest Park," *New York Times*, 26 April 1998, 8–9, 25.

10. Geoffrey Lipman, president of World Travel and Tourism Council, interview with the author, Montreal, September 1994.

11. D. Western, "Ecotourism: The Kenya Challenge," in C. G. Gakahu and B. E. Goode, *Ecotourism and Sustainable Development in Kenya*, Proceedings of the Kenya Ecotourism Workshop. Lake Nakuru National Park, Kenya, 13–17 September 1992 (Nairobi: Wildlife Conservation International, 1992), 15.

12. Among the numerous publications on Kenya's parks and tourism are R. Bonner, *At the Hand of Man: Peril and Hope for Africa's Wildlife* (New York: Vintage Books, 1994); Gakahu and Goode, note 11 above; C. G. Gakahu, ed., "Tourist Attitudes and Use Impacts in Maasai Mara National Reserve," Proceedings of Wildlife Conservation International Workshop (Nairobi: English Press, 1992); and P. Olindo, "The Old Man of Nature Tourism: Kenya," in T. Whelan, ed., *Nature Tourism: Managing for the Environment* (Washington, D.C.: Island Press, 1991).

13. Robert Hall, interviews with the author, June 1998.

14. Meitamei Ole Dapash, activist, interviews with the author, Washington, D.C., 1997, 1998. Publications include C. Alderman, "The Economics and the Role of Privately Owned Lands Used for Nature Tourism, Education, and Conservation" (paper presented at the Fourth World Congress of National Parks and Protected Areas, Caracas, Venezuela, February 1992).

Voluntary Simplicity and the New Global Challenge

Duane Elgin

At the heart of the simple life is an emphasis on harmonious and purposeful living. Richard Gregg was a student of Gandhi's teaching and, in 1936, he wrote the following about a life of "voluntary simplicity":

> Voluntary simplicity involves both inner and outer condition. It means singleness of purpose, sincerity and honesty within, as well as avoidance of exterior clutter, of many possessions irrelevant to the chief purpose of life. It means an ordering and guiding of our energy and our desires, a partial restraint in some directions in order to secure greater abundance of life in other directions. It involves a deliberate organization of life for a purpose. Of course, as different people have different purposes in life, what is relevant to the purpose of one person might not be relevant to the purpose of another. … The degree of simplification is a matter for each individual to settle for himself.[1]

There is no special virtue to the phrase *voluntary simplicity*—it is merely a label, and a somewhat awkward label at that. Still, it does acknowledge explicitly that simpler living integrates both inner and outer aspects of life into an organic and purposeful whole.

To live more *voluntarily* is to live more deliberately, intentionally, and purposefully—in short, it is to live more consciously. We cannot be deliberate when we are distracted from life. We cannot be intentional when we are not paying attention. We cannot be purposeful when we are not being present. Therefore, to act in a voluntary manner is to be aware of ourselves as we move through life. This requires that we not only pay attention to the actions we take in the outer world, but also that we pay attention to ourselves acting—our inner world. To the extent that we do not notice both inner and outer aspects of our passage through life, then our capacity for voluntary, deliberate, and purposeful action is commensurately diminished.

To live more simply is to live more purposefully and with a minimum of needless distraction. The particular expression of *simplicity* is a personal matter. We each know where our lives are unnecessarily complicated. We are all painfully aware of the clutter and pretense that weigh upon us and make our passage through the world more cumbersome and awkward. To live more simply is to unburden ourselves—to live more

lightly, cleanly, aerodynamically. It is to establish a more direct, unpretentious, and unencumbered relationship with all aspects of our lives: the things that we consume, the work that we do, our relationships with others, our connections with nature and the cosmos, and more. Simplicity of living means meeting life face-to-face. It means confronting life clearly, without unnecessary distractions. It means being direct and honest in relationships of all kinds. It means taking life as it is—straight and unadulterated.

When we combine these two ideas for integrating the inner and outer aspects of our lives, we can describe *voluntary simplicity* as a manner of living that is outwardly more simple and inwardly more rich, a way of being in which our most authentic and alive self is brought into direct and conscious contact with living. This way of life is not a static condition to be achieved, but an ever-changing balance that must be continuously and consciously made real. Simplicity in this sense is not simple. To maintain a skillful balance between the inner and outer aspects of our lives is an enormously challenging and continuously changing process. The objective is not dogmatically to live with less, but is a more demanding intention of living with balance in order to find a life of greater purpose, fulfillment, and satisfaction.

Misconceptions about the Simple Life

Some people tend to equate ecological living with a life characterized by poverty, antagonism to progress, rural living, and the denial of beauty. It is important to acknowledge these misconceptions so that we can move beyond them.

Impoverished Living

Although some spiritual traditions have advocated a life of extreme renunciation, it is inaccurate to equate simplicity with poverty. My awakening to the harsh reality of poverty began on my father's farm in Idaho, where I worked with people who lived on the edge of subsistence. I remember one fall harvest when I was about ten years old in the early 1950s. We were harvesting a forty-acre field of lettuce, and a crew of twenty or so migrant laborers arrived to go to work. I still recall a family of three—a father, mother, and a daughter about my age—that drove their old Mercury sedan down the dusty road into our farm. They parked in the field and, with solemn faces, worked through the day doing piece labor—getting paid for the number of crates of lettuce they filled. At the end of the day they received their few dollars of wages as a family, earning roughly sixty-five cents an hour. That evening I returned to the fields with my father to check on the storage of the crates of lettuce and found the family parked at the edge of the field, sitting against the side of their car, and eating an evening meal that consisted of a loaf of white bread, a few slices of lunch meat, and a small jar of mayonnaise. I wondered how they managed to work all day on such a limited meal but asked no questions. When I arrived for work the following morning, they got out of their car where they had slept the night and began working another day. After they had repeated this cycle for three days, the harvest was finished and they left. This was

just one of innumerable personal encounters with poverty. Over the next fifteen years I worked in the fields each summer and gradually came to realize that most of these people did not know whether, in another week or month, their needs for food and shelter would be met by their meager salary.

As I worked side by side with these fine people, I saw that poverty has a very human face—one that is very different from "simplicity." Poverty is involuntary and debilitating, whereas simplicity is voluntary and enabling. Poverty is mean and degrading to the human spirit, whereas a life of conscious simplicity can have both a beauty and a functional integrity that elevates the human spirit. Involuntary poverty generates a sense of helplessness, passivity, and despair, whereas purposeful simplicity fosters a sense of personal empowerment, creative engagement, and opportunity. Historically those choosing a simpler life have sought the golden mean—a creative and aesthetic balance between poverty and excess. Instead of placing primary emphasis on material riches, they have sought to develop, with balance, the invisible wealth of experiential riches.

If the human family sets a goal for itself of achieving a moderate standard of living for everyone, computer projections suggest that the world could reach a sustainable level of economic activity that is roughly "equivalent in material comforts to the average level in Europe in 1990."[2] If we do not delay but act with decision and determination, then humanity need not face a future of poverty and sacrifice. The earth can sustain a moderate and satisfying material standard of living for the entire human family.

Turning away from Progress

Ecological living does not imply turning away from economic progress; rather it seeks to discover which technologies are most appropriate and helpful in moving toward a sustainable future. Ecological living is not a path of "no growth" but a path of "new growth" that includes both material and spiritual dimensions of life. A simpler way of life is not a retreat from progress; in fact it is essential to the advance of civilizations. After a lifetime of study of the rise and fall of the world's civilizations, historian Arnold Toynbee concluded that the measure of a civilization's growth was not to be found in the conquest of other people or in the possession of land. Rather he described the essence of growth in what he called the *Law of Progressive Simplification.*[3] True growth, he said, is the ability of a society to transfer increasing amounts of energy and attention from the material side of life to the nonmaterial side and thereby to advance its culture, capacity for compassion, sense of community, and strength of democracy. We are now being pushed by necessity to discover freshly the meaning of "true growth" by progressively simplifying the material side of our lives and enriching the nonmaterial side.

Rural Living

In the popular imagination there is a tendency to equate the simple life with Thoreau's cabin in the woods by Walden Pond and to assume that people must live an

isolated and rural existence. Interestingly, Thoreau was not a hermit during his stay at Walden Pond. His famous cabin was roughly a mile from the town of Concord, and every day or two he would walk into town. His cabin was so close to a nearby highway that he could smell the pipe smoke of passing travelers. Thoreau wrote that he had "more visitors while I lived in the woods than any other period of my life."[4]

The romanticized image of rural living does not fit the modern reality, as a majority of persons choosing a life of conscious simplicity do not live in the backwoods or rural settings; they live in cities and suburbs. While ecological living brings with it a reverence for nature, this does not require moving to a rural setting. Instead of a "back to the land" movement, it is more accurate to describe this as a "make the most of wherever you are" movement.

Denial of Beauty

The simple life is sometimes viewed as a primitive approach to living that advocates a barren plainness and denies the value of beauty and aesthetics. While the Puritans, for example, were suspicious of the arts, many other advocates of simplicity have seen it as essential for revealing the natural beauty of things. Many who adopt a simpler life would surely agree with Pablo Picasso, who said that "art is the elimination of the unnecessary." The influential architect Frank Lloyd Wright was an advocate of an "organic simplicity" that integrates function with beauty and eliminates the superfluous. In his architecture a building's interior and exterior blend into an organic whole, and the building, in turn, blends harmoniously with the natural environment.[5] Rather than involving a denial of beauty, simplicity liberates the aesthetic sense by freeing things from artificial encumbrances. From a transcendental perspective, simplicity removes the obscuring clutter and discloses the spirit that infuses all things.

It is important to acknowledge these misleading stereotypes because they suggest a life of regress instead of progress. These misconceptions make a simpler life seem impractical and unapproachable and thereby reinforce the feeling that nothing can be done to respond to our critical world situation. To move from denial to action, we need an accurate understanding of the nature of simpler living and its relevance for the modern era.

Common Expressions of Ecological Ways of Living

There is no cookbook for defining a life of conscious simplicity. Richard Gregg, for example, was insistent that "simplicity is a relative matter depending on climate, customs, culture, and the character of the individual."[6] Henry David Thoreau was also clear that no simple formula could define the worldly expression of a simpler life. He said, "I would not have anyone adopt my mode of living on my account. … I would have each one be very careful to find out and pursue his own way."[7] Nor did Mahatma Gandhi advocate a blind denial of the material side of life. He said, "As long as you derive inner help and comfort from anything, you should keep it. If you were to give it up in a mood of self-sacrifice or out of a stern sense of duty, you would continue to

want it back, and that unsatisfied want would make trouble for you. Only give up a thing when you want some other condition so much that the thing no longer has any attraction for you."[8] Because simplicity has as much to do with each person's purpose in living as it does with his or her standard of living, it follows that there is no single, "right and true" way to live more ecologically and compassionately.

Although there is no dogmatic formula for simpler living, there is a general pattern of behaviors and attitudes that is often associated with this approach to living. Those choosing a simpler life:

- Tend to invest the time and energy freed up by simpler living in activities with their partner, children, and friends (walking, making music together, sharing a meal, camping, etc.), or volunteering to help others, or getting involved in civic affairs to improve the life of the community.
- Tend to work on developing the full spectrum of their potentials: physical (running, biking, hiking, etc.), emotional (learning the skills of intimacy and sharing feelings in important relationships), mental (engaging in lifelong learning by reading, taking classes, etc.), and spiritual (learning to move through life with a quiet mind and compassionate heart).
- Tend to feel an intimate connection with the earth and a reverential concern for nature. In knowing that the ecology of the earth is a part of our extended "body," people tend to act in ways that express great care for its well-being.
- Tend to feel a compassionate concern for the world's poor; a simpler life fosters a sense of kinship with people around the world and thus a concern for social justice and equity in the use of the world's resources.
- Tend to lower their overall level of personal consumption—buy less clothing (with more attention to what is functional, durable, aesthetic, and less concern with passing fads, fashions, and seasonal styles), buy less jewelry and other forms of personal ornamentation, buy fewer cosmetic products and observe holidays in a less commercialized manner.
- Tend to alter their patterns of consumption in favor of products that are durable, easy to repair, nonpolluting in their manufacture and use, energy-efficient, functional, and aesthetic.
- Tend to shift their diet away from highly processed foods, meat, and sugar toward foods that are more natural, healthy, simple, and appropriate for sustaining the inhabitants of a small planet.
- Tend to reduce undue clutter and complexity in their personal lives by giving away or selling those possessions that are seldom used and could be used productively by others (clothing, books, furniture, appliances, tools, etc.).
- Tend to use their consumption politically by boycotting goods and services of companies whose actions or policies they consider unethical.
- Tend to recycle metal, glass, and paper and to cut back on consumption of items that are wasteful of nonrenewable resources.
- Tend to pursue a livelihood that directly contributes to the well-being of the world and enables a person to use more fully his or her creative capacities in ways that are fulfilling.

- Tend to develop personal skills that contribute to greater self-reliance and reduce dependence upon experts to handle life's ordinary demands (for example, basic carpentry, plumbing, appliance repair, gardening, crafts, etc.).
- Tend to prefer smaller-scale, more human-sized living and working environments that foster a sense of community, face-to-face contact, and mutual caring.
- Tend to alter male-female roles in favor of non-sexist patterns of relationship.
- Tend to appreciate the simplicity of nonverbal forms of communication—the eloquence of silence, hugging and touching, the language of the eyes.
- Tend to participate in holistic health-care practices that emphasize preventive medicine and the healing powers of the body when assisted by the mind.
- Tend to involve themselves with compassionate causes, such as protecting rain forests and saving animals from extinction, and tend to use nonviolent means in their efforts.
- Tend to change transportation modes in favor of public transit, car pooling, smaller and more fuel-efficient autos, living closer to work, riding a bike, and walking.

Because there is a tendency to emphasize the external changes that characterize simpler living, it is important to reiterate that this approach to life is intended to integrate both inner and outer aspects of existence into a satisfying and purposeful whole.

Maintaining Ourselves and Surpassing Ourselves

An ecological approach to living invites us to continuously balance two aspects of life—maintaining ourselves (creating a workable existence) and surpassing ourselves (creating a meaningful existence). A statement by the philosopher and feminist Simone de Beauvoir helps clarify this: "Life is occupied in both perpetuating itself and in surpassing itself; if all it does is maintain itself, then living is only not dying." On the one hand, if we seek *only* to maintain ourselves, then no matter how grand our style of living might be, we are doing little more than "only not dying." On the other hand, if we strive *only* for a meaningful existence without securing the material foundation that supports our lives, then our physical existence is in jeopardy and the opportunity to surpass ourselves becomes little more than a utopian dream. Although many of the expressions of a simpler life listed above emphasize actions that promote a more sustainable existence, this should not distract us from the importance of the surpassing or inner dimensions of a life of conscious simplicity.

The many expressions of simpler living, both inner and outer, indicate that this is much more than a superficial change in the *style* of life. A "style" change refers generally to an exterior change, such as a new fad or fashion. Simplicity goes far deeper and involves a change in our *way* of life. Ecological living is a sophisticated response to the demands of deteriorating industrial civilizations. Table 42.1 shows the contrasts between the worldview of the industrial era and that of the emerging ecological era. Simpler ways of living in the ecological era will result in changes as great as the transition from the agrarian era to the industrial era. In an interdependent, ecologically

TABLE 42.1
Contrasts in Worldview between the Industrial Era and the Ecological Era

Industrial-Era View	Ecological-Era View
The goal in life is material progress.	The goal in life is to co-evolve both the material and spiritual aspects with harmony and balance.
Emphasis on conspicuous consumption—the "good life" is dependent upon having enough money to buy access to life's pleasures and to avoid life's discomforts.	Emphasis on conservation and frugality—using only as much as is needed; a satisfying life emerges with balanced development in cooperation with others.
Identity is defined by material possessions and social position.	Identity is revealed through our loving and creative participation in life.
The individual is defined by his or her body and is ultimately separate and alone.	The individual is both unique and an inseparable part of the larger universe; identity is not limited to our physical existence.
The universe is viewed as material and largely lifeless; it is natural that we who are living exploit the lifeless universe for our ends.	The universe is a living organism that is infused with a subtle life-force; it is important to act in ways that honor the preciousness and dignity of all life.
Emphasis on self-serving behavior (get as much for myself as I can while giving no more than is required in return).	Emphasis on life-serving behavior (give as much of myself to life as I am able and ask in return no more than I require).
Cutthroat competition prevails; compete against others and strive to "make a killing."	Fair competition prevails; cooperate with others and work to earn a living.
The mass media are dominated by commercial interests and are used aggressively to promote a high-consumption culture.	The mass media are used to promote a balanced diet of information and messages, including the importance of ecological approaches to living.
Nations adopt a "lifeboat ethic" in global relations.	Nations adopt a "spaceship Earth ethic" in global relations.
The welfare of the whole is left to the workings of the free market and/or government bureaucracies.	Each person takes responsibility for the well-being of the world.
Emphasis on personal autonomy and mobility.	Emphasis on connectedness and community.

conscious world every aspect of life will be touched and changed: consumption levels and patterns, living and working environments, political attitudes and processes, international ethics and relations, the uses of mass media, education, and many more.

The Push of Necessity and the Pull of Opportunity

Two compelling reasons exist for choosing more ecological approaches to living: the push of necessity and the pull of opportunity. The combined impact of the various *pushes of necessity* are staggering to contemplate. Here is an overview of our predicament:

- In 1930 the world had 2 billion people, in 1975 roughly 4 billion people, by the year 2000 the population is expected to exceed 6 billion people, and 2025 the world's population will approach 9 billion people. The vast majority of the increase in human numbers is occurring in the less-developed nations. Because the world's ecosystem is already under great stress, as these new billions of persons seek a decent standard of living, the global ecology could easily be strained beyond the breaking point, producing a calamity of unprecedented proportions.
- The gap between rich and poor nations is already a chasm and is growing wider rapidly. The average person in the richest one-fifth of the world's countries earned

$15,000 in 1990, whereas the average person in the poorest one-fifth of the world's countries earned $250. This sixty-fold differential between the rich and poor is double what it was in 1960.[9]

- More than 1.2 billion now live in absolute poverty—"a condition of life so limited by malnutrition, illiteracy, disease, squalid surroundings, high infant mortality and low life expectancy as to be beneath any reasonable definition of human decency."[10]
- Global warming will likely alter patterns of rainfall and disrupt food production, flood enormous areas of low-lying lands, displace millions of people, destroy fragile ecosystems, and alter patterns of disease in unpredictable ways.[11]
- Tropical rain forests are being cut down at an alarming rate, contributing to global warming and destroying precious ecosystems that required millions of years to evolve (and that contain a treasury of undiscovered pharmaceuticals).
- Cheaply available supplies of oil are being depleted rapidly and, within a generation, the world will be deprived of an energy source basic to our current form of high-intensity agriculture.
- Toxic wastes are being poured into the environment, and pollution-induced outbreaks of cancer and genetic damage may reach massive proportions.
- Overfishing and pollution of the world's oceans have led to a leveling off in annual fish catch at the same time that the demand for food from the world's oceans is increasing.
- The ozone layer is thinning over-populated regions of both the Southern and the Northern Hemispheres and threatens to cause skin cancer and cataracts in humans and unknown damage to the rest of the food chain.
- Thousands of plant and animal species are becoming extinct each year, representing the greatest loss of life on the planet since the massive extinction of dinosaurs and other animal and plant life roughly 65 million years ago.
- Acid rains from coal burning and sulfur-producing industrial processes are damaging forests, farmland, and freshwater streams.

These are not isolated problems; instead they comprise a tightly intertwined system of problems that require us to develop new approaches to living if we are to live sustainably. To live *sustainably*, we must live efficiently—not misdirecting or squandering the earth's precious resources. To live *efficiently*, we must live peacefully, for military expenditures represent an enormous diversion of resources from meeting basic human needs. To live *peacefully*, we must live with a reasonable degree of *equity*, or fairness, for it is unrealistic to think that, in a communications-rich world, a billion or more persons will accept living in absolute poverty while another billion live in conspicuous excess. Only with greater fairness in the consumption of the world's resources can we live peacefully, and thereby live sustainably, as a human family. Without a revolution in fairness, the world will find itself in chronic conflict over dwindling resources, and this in turn will make it impossible to achieve the level of cooperation necessary to solve problems such as pollution and overpopulation.

The United Nations *Human Development Report* of 1992 said, "In a world of 5 billion people, we discovered that the top billion people hold 83 percent of the world's wealth, while the bottom billion have only 1.4 percent."[12] We cannot expect to live in a

peaceful world with such enormous disparities between the rich and the poor. The prosperity of the technologically interdependent, wealthy nations is vulnerable to disruption by terrorism by those who have nothing left to lose and no hope for the future. *Only with greater equity can we expect to live peacefully, and only with greater harmony can we expect to live sustainably.*

If the world is profoundly divided materially, there is very little hope that it can be united socially, psychologically, and spiritually. Therefore if we intend to live together peacefully as members of a single, human family, then each individual has a right to a reasonable share of the world's resources. Each person has a right to expect a fair share of the world's wealth sufficient to support a "decent" standard of living—one that provides enough food, shelter, education, and health care to enable people to realize their potentials as productive and respected members of the family of humanity. This does not mean that the world should adopt a single manner and standard of living; rather, it means that each person needs to feel part of the global family and, within a reasonable range of differences, valued and supported in realizing his or her unique human potential.

With sustainability we can expand our experiential riches of culture, compassion, community, and self-determination. With a growing abundance of experiential riches the entire process of living will be encouraged, and a self-reinforcing spiral of development will unfold. Therefore, reinforcing the powerful push of necessity is the *pull of opportunity*—the potential of the simple life to yield a more satisfying and soulful existence. Many persons in developed nations find life to be psychologically and spiritually hollow—living in massive urban environments of alienating scale and complexity, divorced from the natural environment, and working in jobs that are unsatisfying. Many yearn for a more authentic approach to living, one that provides a fulfilling relationship with oneself, with others, with the earth, and with the universe. *Time* magazine and CNN television conducted a survey of Americans for *Time*'s April 8, 1991, cover story entitled "The Simple Life." The results are striking:

- Sixty-nine percent of the people surveyed said they would like to "slow down and live a more relaxed life," in contrast to only 19 percent who said they would like to "live a more exciting, faster-paced life."
- Sixty-one percent agreed that "earning a living today requires so much effort that it's difficult to find time to enjoy life."
- When asked about their priorities, 89 percent said it was more important these days to spend time with their families.
- Only 13 percent saw importance in keeping up with fashion trends, and just 7 percent thought it was worth bothering to shop for status-symbol products.

Another survey reported in a 1989 article in *Fortune* magazine entitled "Is Greed Dead?" found that 75 percent of working Americans between the ages of twenty-five and forty-nine would like "to see our country return to a simpler lifestyle, with less emphasis on material success."[13] Only 10 percent of those polled thought that "earning a lot of money" was an indicator of success. These polls reveal that a large fraction of the American public has experienced the limited rewards from the material riches of a consumer society and is looking for the experiential riches that can be found, for

example, in satisfying relationships, living in harmony with nature, and being of service to the world.

The combination of the push of necessity and the pull of opportunity creates an entirely new situation for humanity. On the one hand, a life of creative simplicity frees energy for the soulful work of spiritual discovery and loving service—tasks that all of the world's wisdom traditions say we should give our highest priority. On the other hand, a simpler way of life also responds to the urgent needs for moderating our use of the world's nonrenewable resources and minimizing the damaging impact of environmental pollution. Working in concert, these pushes and pulls are creating an immensely powerful dynamic for transforming our ways of living, working, relating, and thinking.

The Responsibility for Change

Unless dramatic changes are made in the manner of living and consuming in industrialized nations, we will soon produce a world of monumental destruction, suffering, conflict, and despair. Within this generation we must begin a sweeping reinvention of our ways of living or invite the collapse of our biosphere and allow global civilization to veer off into a long detour and dark age.

Because we face a crisis in the interconnected global system, changes at every level are needed. At the personal level we need a magnified global awareness and simpler ways of living. At the neighborhood level we need new types of communities for sustainable living. At the national level we need to adopt new policies with regard to energy, environment, education, media, and many more. At the global level we need new partnerships among nations. Although changes are necessary at every level, the foundation upon which success can be built is the individual and the family. It is empowering to know that each person can make a difference by taking responsibility for changes in his or her immediate life.

Just as we tend to wait for our problems to solve themselves, so, too, do we tend to wait for our traditional institutions and leaders to provide us with guidance as to what we should do. Yet our leaders are bogged down, trying to cope with our faltering institutions. They are so enmeshed in crisis management that they have little time to exercise genuinely creative leadership. We may keep waiting for someone else, but a key message of this book is that there is no one else. You are it. We are it. Each of us is responsible. It is we who, one by one, must take charge of our lives. It is we who, one by one, must act to restore the balance. We are the ones who are responsible for making it through this time of sweeping change as we work to build a sustainable future for the planet.

NOTES

1. Richard Gregg, "Voluntary Simplicity," reprinted in *Co-Evolution Quarterly*, Sausalito, Calif., Summer 1977 (originally published in the Indian journal *Visva-Bharati Quarterly* in August 1936).

2. Donella H. Meadows, et. al., *Beyond the Limits* (Post Mills, Vt.: Chelsea Green Publishing, 1992), p. 196.

3. Arnold Toynbee, *A Study of History*, Vol. 1 (New York: Oxford University Press, 1947), p. 198.

4. David Shi, *The Simple Life: Plain Living and High Thinking in American Culture* (New York: Oxford University Press, 1985), p. 145.

5. Ibid., p. 187.

6. Gregg, op. cit, p. 20.

7. Shi, op. cit, p. 149.

8. Quoted in Gregg, op. cit, p. 27.

9. Results from the 1992 *Human Development Report* (published by the United Nations) were reported in the *San Francisco Chronicle*, April 24, 1992, p. 20.

10. This definition of absolute poverty was taken from the "Address to the Board of Governors" of the World Bank by Robert McNamara, president, September 30, 1980, Washington, D.C.

11. See, for example, George Sanderson, "Climate Change: The Threat to Human Health," in *The Futurist*, Bethesda, Md., March—April 1992.

12. Ibid.

13. Survey done by *Research & Forecasts* for Chivas Regal, reported in the article by Ronald Henkoff, "Is Greed Dead," *Fortune*, August 14, 1989. Regional polls confirm these findings. A poll conducted in the San Francisco Bay area in 1986 found that when people were "given a choice between a simpler life with fewer material possessions and reaching a higher standard of living, they favored the simpler life by almost 3 to 1." Reported in the *San Francisco Chronicle*, October 2, 1986.

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Page numbers in boldface refer to graphs and figures.

The Perception of the Environment

Essays on livelihood, dwelling and skill

Tim Ingold

London and New York

The Perception of the Environment

In this work Tim Ingold offers a persuasive new approach to understanding how human beings perceive their surroundings. He argues that what we are used to calling cultural variation consists, in the first place, of variations in skill. Neither innate nor acquired, skills are *grown*, incorporated into the human organism through practice and training in an environment. They are thus as much biological as cultural. To account for the generation of skills we have therefore to understand the dynamics of development. And this in turn calls for an ecological approach that situates practitioners in the context of an active engagement with the constituents of their surroundings.

The twenty-three essays comprising this book focus in turn on the procurement of livelihood, on what it means to 'dwell', and on the nature of skill, weaving together approaches from social anthropology, ecological psychology, developmental biology and phenomenology in a way that has never been attempted before. The book is set to revolutionise the way we think about what is 'biological' and 'cultural' in humans, about evolution and history, and indeed about what it means for human beings – at once organisms and persons – to *inhabit* an environment. *The Perception of the Environment* will be essential reading not only for anthropologists but also for biologists, psychologists, archaeologists, geographers and philosophers.

Tim Ingold is Professor of Social Anthropology at the University of Aberdeen.

The Perception of the Environment

Essays on livelihood, dwelling and skill

Tim Ingold

For Anna and Susanna,
in memory of my mother,
L. M. Ingold (1910–1998)

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Acknowledgements

I dedicate this book to three remarkable women: to my mother, Nora Ingold; to my wife, Anna Ingold; and to my daughter, Susanna Ingold. They have given me life, love and happiness. Who could ask for more?

Anthropological Museum of Naples, and held in Naples in March 1996. I am most grateful to Francesca Giusti for the invitation to contribute to the symposium.

Chapter Six actually began as an undergraduate lecture, and was subsequently presented (in Finnish) as a guest lecture to the Anthropological Society of Finland, Helsinki, in March 1995. It has however been completely rewritten for the present volume, and is published here for the first time.

A preliminary sketch for the essay that appears as Chapter Seven was presented to the Seventh International Conference on Hunting and Gathering Societies, held in Moscow in August 1993. I did not find time to write it up properly, however, until 1998, in response to a commission to contribute to a volume, entitled *Animal. Anima. Animus*, accompanying a highly innovative exhibition of the same name mounted by Pori Art Museum, Finland. The volume, edited by Marketta Seppälä, Jari-Pekka Vanhala and Linda Weintraub, was published by the Museum in 1998, and the essay (pp. 181–207) is reproduced here by permission.

Chapter Eight has evolved from a paper first presented to the session on 'Images of self and other' at the Eighth International Conference on Hunting and Gathering Societies, held at the National Museum of Ethnology, Osaka, Japan, in October 1998. It has not been published previously.

Chapter Nine began as one of a series of lectures presented to postgraduate students in psychology at the University of Manchester. It was subsequently published as a chapter in a book based on the series, entitled *Psychological research: innovative methods and strategies*, and edited by the series co-ordinator, John Howarth (London: Routledge, 1996, pp. 99–119).

The essay included here as Chapter Ten has a long history, and has gone through many versions. A rough sketch was presented to the workshop 'Constructing Environments', organised by the Biological and Social Anthropology Committee of the Royal Anthropological Institute, and held in London in January 1991. Later versions were presented to the graduate seminar of the Department of Social Anthropology at the University of Bergen, and to the seminars of the International Centre for Contemporary Cultural Research and the Department of Architecture at the University of Manchester. I then rewrote it once more for the opening session, entitled 'Shifting contexts', of the Fourth Decennial Conference of the Association of Social Anthropologists held at St Catherine's College, Oxford, in July 1993. The essay was first published in a volume of papers from the session, entitled *Shifting contexts: transformations in anthropological knowledge*, edited by Marilyn Strathern (London: Routledge, 1995, pp. 57–80).

Chapter Eleven was originally presented to the session 'Place, time and experience: interpreting prehistoric landscapes', at the Conference of the Theoretical Archaeology Group held at the University of Leicester in December 1991. I later rewrote it for a special issue of the journal *World Archaeology* on 'Conceptions of time and ancient society', under the editorship of Richard Bradley (Volume 25, 1993, pp. 152–74).

An early version of Chapter Twelve was presented to the Association of Social Anthropologists Conference on 'Environmentalism', held at the University of Durham in April 1992. It was published in the resulting volume, *Environmentalism: the view from anthropology*, edited by Kay Milton (London: Routledge, 1993, pp. 31–42).

The essays comprising Chapters Thirteen and Fourteen have been written especially for this volume.

Chapter Fifteen was originally written for presentation to the symposium on 'Doing things with tools', co-organised by Ed Reed and myself, and held as part of the Fourth

Tim Ingold
Aberdeen
March 2000

General introduction

This book has grown from the same concerns as those that, over thirty years ago, led me to embark upon the study of anthropology. At school I had done well in mathematics and, thanks to a wonderful teacher, I had been fired by a passion for physics. It was assumed that I should go to university to read natural science. But my initial enthusiasm soon gave way to disillusionment. Like so many of my contemporaries I was appalled by the extent to which science had reneged both on its sense of democratic responsibility and on its original commitment to enlarge the scope of human knowledge, and had allowed itself to become subservient to the demands of the military-industrial complex. The scientific establishment, it seemed to me, was so massively institutionalised, internally specialised and oppressively hierarchical that as a professional scientist one could never be more than a small cog in a huge juggernaut of an enterprise. Towards the end of my first year at university I went to see my tutor, and politely informed him over a glass of sherry (this was Cambridge!) that natural science was not for me, and that I was seeking a discipline where there was more room to breathe. It would be exciting, I thought, to join in a subject still on the make – one, perhaps, that was in the same formative stage that physics was in at the time of Galileo.

My tutor, whose considerable percipience was laced with a hint of mischief, suggested anthropology. I, of course, with that callow conceit of the Cambridge undergraduate who thinks himself too clever by half, wanted to be the Galileo of anthropology – provided that I did not have to suffer as Galileo did. Though I have long since abandoned these adolescent fantasies, the real intellectual reasons why I took up anthropology then (it was 1967) are still the reasons why I study it now. Concerned about the widening gap between the arts and the humanities on the one hand, and the natural sciences on the other, I was looking for a discipline that would somehow close the gap, or enable us to rise above it, while still remaining close to the realities of lived experience. Anthropology, for me, has been that discipline, and since embarking on it I have never looked back. I have, however, often looked from side to side, observing with mounting despair how it has been fractured along the very lines of fission that I thought it existed to overcome. These fractures ultimately seem to derive from a single, underlying fault upon which the entire edifice of Western thought and science has been built – namely that which separates the 'two worlds' of humanity and nature. For this is what has given us the overriding academic division of labour between the disciplines that deal, on the one hand, with the human mind and its manifold linguistic, social and cultural products, and on the other, with the structures and composition of the material world. And it also cleaves anthropology itself into its sociocultural and biophysical divisions, whose respective practitioners have less to say to one another than they do to colleagues in other disciplines on the same side of the

academic fence. Social or cultural anthropologists would rather read the work of historians, linguists, philosophers and literary critics; biological or physical anthropologists prefer to talk to colleagues in other fields of biology or biomedicine.

My aim has always been to bring these two sides of anthropology together. There must be something wrong, I reasoned, with a social or cultural anthropology that cannot countenance the fact that human beings are biological organisms that have evolved, and that undergo processes of growth and development, as other organisms do. But there must be something equally wrong with a biological anthropology that denies anything but a proximate role for agency, intentionality or imagination in the direction of human affairs. Advocates of both extreme positions are not hard to find, from those who insist, on the one hand, that there is nothing that is not socially or culturally constructed to those, on the other, who hold that all there is to know about human beings is written into our genetic constitution, and therefore that by deciphering the genome we would discover the key to our humanity. In steering a course between these extremes, my first inclination was to argue for the essential complementarity of the biogenetic and sociocultural dimensions of human existence. The fact that human beings are organisms whose life and reproduction depends upon their interaction with organisms of other species, as well as with abiotic components of the environment, does not rule out the possibility that they are also aware of themselves as beings who can relate to one another as subjects, and who can therefore – on this intersubjective level – enjoy a distinctively social life. Likewise, the fact that human beings are the bearers of genes whose specific combination is a product of variation under natural selection does not mean that they cannot also be the bearers of cultural traditions that may be passed on by a process of learning in some ways analogous to, but by the same token fundamentally distinct from, the process of genetic replication.

In 1986 I brought out a book, entitled *Evolution and social life*, in which I attempted, among other things, to establish this complementarity thesis. But as several critics pointed out, the argument of the book did not really cohere, since the connection between the human being as a biological *organism*, and as a social subject or *person*, could not be substantiated save by way of a third term, namely the human mind. The discipline that exists to study the mind is, of course, psychology. In my book I had virtually ignored psychology, largely because I had had my work cut out simply in finding my way through the extensive literatures in anthropology and biology. But the criticism was just: there would seem to be no way of piecing together the two halves of anthropology, the biophysical and sociocultural, without taking a loop through psychology. Clearly, I would have to read up on the subject. I was introduced to it, however, from a rather unorthodox angle. On the recommendation of several friends and colleagues, I turned to the writings of James Gibson and, in particular, to his masterpiece of 1979, *The ecological approach to visual perception*. Reading this book was a revelation: indeed I cannot think of any other work that has exerted a greater influence on my thinking over the last ten years or so. This influence is evident in everything I have written since, including the essays that make up this volume.

Gibson wanted to know how people come to perceive the environment around them. The majority of psychologists, at least at the time when Gibson was writing, assumed that they did so by constructing representations of the world inside their heads. It was supposed that the mind got to work on the raw material of experience, consisting of sensations of light, sound, pressure on the skin, and so on, organising it into an internal model which, in turn, could serve as a guide to subsequent action. The mind, then, was conceived as

a kind of data-processing device, akin to a digital computer, and the problem for the psychologist was to figure out how it worked. But Gibson's approach was quite different. It was to throw out the idea, that has been with us since the time of Descartes, of the mind as a distinct organ that is capable of operating upon the bodily data of sense. Perception, Gibson argued, is not the achievement of a mind in a body, but of the organism as a whole in its environment, and is tantamount to the organism's own exploratory movement through the world. If mind is anywhere, then, it is not 'inside the head' rather than 'out there' in the world. To the contrary, it is immanent in the network of sensory pathways that are set up by virtue of the perceiver's immersion in his or her environment. Reading Gibson, I was reminded of the teaching of that notorious maverick of anthropology, Gregory Bateson. The mind, Bateson had always insisted, is not limited by the skin. Could not an ecological approach to perception provide the link I was looking for, between the biological life of the organism in its environment and the cultural life of the mind in society?

The issue for me, at the time, was to find a way of formulating this link that could also resolve what I felt to be a deep-rooted problem in my own work. Setting out from the complementarity thesis, I had argued that human beings must simultaneously be constituted both as organisms within systems of ecological relations, and as persons within systems of social relations. The critical task for anthropology, it seemed, was to understand the reciprocal interplay between the two kinds of system, social and ecological. In 1986, alongside *Evolution and social life*, I had brought out a book of essays under the title *The appropriation of nature*, all of which sought to explore this interplay in one way or another. But I had continued to be troubled by the inherent dualism of this approach, with its implied dichotomies between person and organism, society and nature. I vividly remember one Saturday morning in April 1988 – an entirely ordinary one for Manchester at that time of year, with grey skies and a little rain – when, on my way to catch a bus, it suddenly dawned on me that the organism and the person could be one and the same. Instead of trying to reconstruct the complete human being from two separate but complementary components, respectively biophysical and sociocultural, held together with a film of psychological cement, it struck me that we should be trying to find a way of talking about human life that eliminates the need to slice it up into these different layers. Everything I have written since has been driven by this agenda.

Why had this view, that the person *is* the organism, and not something added on top, eluded me for so long? In retrospect it seems so obvious as almost to 'go without saying'. I now realise that the obstacle that had prevented me from seeing it was a certain conception of the organism, one that is built into mainstream theory in both evolutionary and environmental biology. According to this conception, every organism is a discrete, bounded entity, a 'living thing', one of a population of such things, and relating to other organisms in its environment along lines of external contact that leave its basic, internally specified nature unaffected. I had assumed that my task was not to challenge accepted biological wisdom but to reconcile it with what contemporary anthropology has to teach us about the constitution of human beings as persons. This is that the identities and characteristics of persons are not bestowed upon them in advance of their involvement with others but are the condensations of histories of growth and maturation within fields of social relationships. Thus every person emerges as a locus of development within such a field, which is in turn carried forward and transformed through their own actions.

Understanding persons in this way, however, calls for a kind of 'relational thinking' that goes right against the grain of the 'population thinking' that has been *de rigueur* in

biological science ever since the establishment of the so-called modern synthesis of Darwinian theory and population genetics. Now so long as the organism and the person are conceived as separate components of the human being, one could perhaps think about the former in populational terms and the latter in relational terms, without fear of contradiction. Whereas the population, it might be said, is of individual objects (organisms), relationships exist between social or cultural subjects (persons). But if persons *are* organisms, then the principles of relational thinking, far from being restricted to the domain of human sociality, must be applicable right across the continuum of organic life. What I glimpsed, on that fateful day in 1988, was that this would require nothing less than a radically alternative biology. For if every organism is not so much a discrete entity as a node in a field of relationships, then we have to think in a new way not only about the interdependence of organisms and their environments but also about their evolution.

Of course, like all good ideas, others had had it before. On further inquiry I discovered that there already existed a considerable literature taking up what I would call a relational view of the organism, and that sets out expressly to break the stranglehold that neo-Darwinian theory has tended to exert, up to now, on mainstream biological thought. Significantly, most of the contributors to this literature work in the field of developmental biology. They have been concerned to unravel the dynamics of those processes of growth and maturation that actually give rise to the forms and capacities of organisms. And they have shown, quite convincingly, that it is not enough to regard these forms and capacities as the mere expressions of designs or blueprints that have already been established by natural selection, and that are imparted to every organism-to-be – along with its complement of genes – at the moment of conception. The characteristics of organisms, they argue, are not so much expressed as *generated* in the course of development, arising as emergent properties of the fields of relationship set up through their presence and activity within a particular environment. Here, then, was the biology that would help to substantiate my view of the organism-person, undergoing growth and development in an environment furnished by the work and presence of others.

It is a biology, however, that also resonates very closely with the principles of Gibsonian ecological psychology. Both approaches take as their point of departure the developing organism-in-its-environment, as opposed to the self-contained individual confronting a world 'out there'. The approaches are linked, too, in terms of their opposition to established positions in biology and psychology. Indeed there is a striking parallel between the 'developmentalist' critique of neo-Darwinian biology and the 'ecological' critique of mainstream cognitive psychology. In both cases the objection is to the idea that what an organism does, or what it perceives, is the calculated output of an intelligent design, whether that intelligence be equated with the mind or with natural selection (which is, after all, but the reflection of scientific reason in the mirror of nature). Moreover, a very similar objection can be raised against those versions of culture theory, in anthropology, that would attribute human behaviour to designs that are passed from one generation to the next as the content of acquired tradition. These parallels led me to suggest that a combination of 'relational' thinking in anthropology, 'ecological' thinking in psychology and 'developmental systems' thinking in biology would yield a synthesis infinitely more powerful than any of the 'biosocial', 'psychocultural' or 'biopsychocultural' alternatives currently on offer, all of which invoke some version of the complementarity thesis.

Crucially, such a synthesis would start from a conception of the human being not as a composite entity made up of separable but complementary parts, such as body, mind and culture, but rather as a singular locus of creative growth within a continually unfolding

field of relationships. In the following chapters I pursue three implications of this approach. The first is that much if not all of what we are accustomed to call cultural variation in fact consists of variations of *skills*. By skills I do not mean techniques of the body, but the capabilities of action and perception of the whole organic being (indissolubly mind and body) situated in a richly structured environment. As properties of human organisms, skills are thus as much biological as cultural. Secondly, and stemming from the above, becoming skilled in the practice of a certain form of life is not a matter of furnishing a set of generalised capacities, given from the start as compartments of a universal human nature, with specific cultural content. Skills are not transmitted from generation to generation but are regrown in each, incorporated into the *modus operandi* of the developing human organism through training and experience in the performance of particular tasks. Hence, thirdly, the study of skill demands a perspective which situates the practitioner, right from the start, in the context of an active engagement with the constituents of his or her surroundings. I call this the 'dwelling perspective'. Humans, I argue, are brought into existence as organism-persons within a world that is inhabited by beings of manifold kinds, both human and non-human. Therefore relations among humans, which we are accustomed to calling 'social', are but a sub-set of ecological relations.

The essays collected together here comprise a series of attempts to establish this relational-ecological-developmental synthesis. I have come to the project from a background in ecological anthropology, in the anthropology of technology, and in the history of anthropological theory. In my ecological work I have concentrated on the comparative study of hunter-gatherer and pastoral societies, an interest that has its roots in my earlier research on northern circumpolar reindeer hunting and herding peoples. This accounts for my particular concern with human-animal relations, and with the conceptualisation of the humanity-animality interface. It is also the reason why, in selecting ethnographic material to substantiate my arguments, I have tended to go for studies of northern circumpolar societies. My interest in technology developed in part from a reconsideration of the significance of toolmaking as an index of human distinctiveness, and in part from a growing interest in the connection, in human evolution, between technology and language. More recently, I have tried to find ways of bringing together the anthropologies of technology and of art, and it is this, above all, that has led me to my present view of the centrality of skilled practice. In my work on the history of theory I focused on the way in which the notion of evolution has figured in the writings of anthropologists, biologists and historians from the late nineteenth century to the present. The key question to which I sought an answer was how, if at all, the concept of evolution was to be separated from that of history. I did not resolve this question to my satisfaction, and it has remained at the top of my agenda. I believe now that the proposed synthesis of relational, ecological and developmental approaches offers a solution.

The volume is divided into three parts. In the first, on 'livelihood', my concern is to find a way of comprehending how human beings relate to their environments, in the tasks of making a living, that does not set up a polarity between the ecological domain of their relations with non-human 'nature' and the cognitive domain of its cultural construction. The second part, on 'dwelling', explores the implications of the position that awareness and activity are rooted in the engagement between persons and environment for our understanding of perception and cognition, architecture and the built environment, local and global conceptions of environmental change, landscape and temporality, mapping and wayfinding, and the differentiation of the senses. In the third part, on 'skill', I show how a focus on practical enskilment, conceived as the embodiment of capacities of awareness and response by environmentally situated agents, can help us to overcome both an overly

rigid division between the works of human beings and those of non-human animals and, in the human case, the opposition between the fields of 'art' and 'technology'. This tripartite division is, however, largely a matter of convenience. The parts themselves are anything but watertight. All I can say is that there is a rather greater density of thematic interconnectedness among the chapters making up each part than there is between them.

As for the individual chapters, they are of diverse origin. Most were initially written for presentation at conferences, and have been extensively revised since. Earlier versions of many of these have already appeared in conference publications. Naturally, the form and substance of each essay have to some extent been dictated by the needs of the occasion for which it was originally prepared. All were written, however, with the ultimate intention of bringing them together into one coherent work. With one exception, none dates back more than a decade: thus they all represent my post-1988 thinking. The exception is Chapter 15, which I first drafted for a conference in 1987. I have included it here since it marks the beginnings of my reconsideration of the concept of technology. Four chapters (Six, Eight, Thirteen and Fourteen) have been written specially for this volume. Chapter Fourteen is by far and away the longest, and it was undoubtedly, for me, the most challenging to write. Surveying the book in its entirety, I see it somewhat in the shape of a mountain, with a steady climb through the first part, a brief plateau at the start of the second followed by an ascent to the summit in Chapters Thirteen and Fourteen. Having reached that far, the third part affords a relatively easy descent. But like a mountain, one could just as well proceed in the other direction, starting with the third part and ending with the first. Indeed there is no fixed order in which the chapters should be tackled. Each can be read and understood on its own, or as one of the set of explorations of closely connected themes comprising each part, which in turn can be read as one aspect of the total intellectual project comprised by the book as a whole.

Before closing this general introduction, I should insert a note about my use of the concepts of 'the Western' and 'the modern'. These concepts have been the source of no end of trouble for anthropologists, and I am no exception. Every time I find myself using them I bite my lip with frustration, and wish that I could avoid it. The objections to the concepts are well known: that in most anthropological accounts they serve as a largely implicit foil against which to contrast a 'native point of view'; that much of the philosophical ammunition for the critique of so-called Western or modern thought comes straight out of the Western tradition itself (thus we find such figures as the young Karl Marx, Martin Heidegger and Maurice Merleau-Ponty enlisted in the enterprise of showing how the understandings of North American Indians, New Guinea Highlanders or Australian Aborigines differ from those of 'Euro-Americans'); that once we get to know people well – even the inhabitants of nominally Western countries – not one of them turns out to be a full-blooded Westerner, or even to be particularly modern in their approach to life; and that the Western tradition of thought, closely examined, is as richly various, multivocal, historically changeable and contest-riven as any other.

For those of us who call ourselves academics and intellectuals, however, there is a good reason why we cannot escape 'the West', or avoid the anxieties of modernity. It is that our very activity, in thinking and writing, is underpinned by a belief in the absolute worth of disciplined, rational inquiry. In this book, it is to this belief that the terms 'Western' and 'modern' refer. And however much we may object to the dichotomies to which it gives rise, between humanity and nature, intelligence and instinct, the mental and the material, and so on, the art of critical disputation on these matters is precisely what 'the West' is all about. For when all is said and done, there can be nothing more 'Western',

or more 'modern', than to write an academic book such as this. Nor can I be anything less than profoundly grateful for the freedom, education and institutional facilities that have allowed me to do so.

Part I

Livelihood

INTRODUCTION

My focus, in the essays making up this part, is on the ways in which human beings relate to components of their environment in the activities of subsistence procurement. I draw, in particular, on ethnographic studies of people who make their living primarily by hunting and gathering. In the existing anthropological literature on hunting and gathering societies, questions of how people interact, practically and technically, with the resources of their environment in obtaining a livelihood tend to be treated separately from questions of how their lifeworld is imaginatively 'constructed', in myth, religion and ceremony. The former are typically addressed in naturalistic terms, often by way of comparison with the foraging behaviour of non-human animals, and drawing on the same frameworks of concepts and theory as have been employed by animal ecologists. The latter, by contrast, are considered suitable topics for cultural analysis, concerned as it is with the ways in which the environment, and people's relations with it, are represented in consciousness. I believe that this division between naturalistic and 'culturalogical' accounts is unfortunate, in that it takes for granted precisely the separation, of the naturally real from the culturally imagined, that needs to be put into question if we are to get to the bottom of people's own perceptions of the world. Starting from the premise that ways of acting in the environment are also ways of perceiving it, these essays suggest how the division might be overcome.

I set the scene, in Chapter One, by comparing the accounts that Western biologists and indigenous hunters give of the behaviour of caribou during episodes of predation. I show that the scientific authority of the former account, as well as the anthropological understanding of the latter as fitting within a culturally specific cosmology, depend on a two-step movement of disengagement that cuts out first nature, then culture, as objects of attention. I then set out to retrace these steps in the reverse direction, in an attempt to replace the dichotomy of nature and culture with the synergy of organism and environment, and thereby to regain a genuine ecology of life. The inspiration for this move comes from the work of Gregory Bateson, whose ideas are introduced through a contrast with those of Claude Lévi-Strauss. Both authors set out to demolish the distinction between mind and nature, but whereas for Lévi-Strauss the mind recovers information from the world through a process of decoding, for Bateson it is opened out to the world in a process of revelation. This contrast is linked to two senses in which it might be said that novices, in learning to perceive the world around them, are furnished with 'keys to meaning'. The key could be a cipher or a clue. I argue that sensory education consists in the acquisition of clues, not ciphers, and that songs and stories – including stories of how

animals respond to the presence of the hunter – give shape to a perception of the world guided by this education. The knowledge grounded in such perception, I conclude, amounts to what may be regarded as a 'sentient ecology'.

In the following two chapters I argue, first, against the naturalisation of the hunter-gatherer economy under the rubric of 'foraging', and secondly, against the complementary claim that in the eyes of the people themselves, the environment they inhabit is cultur-ally constructed. Chapter Two is a critique of attempts, under the guise of 'human evolutionary ecology', to apply models designed for the study of non-human foraging behaviour to the analysis of human hunting and gathering. This application results from a conflation of rational choice theory, drawn from classical microeconomics, with the theory of natural selection, drawn from evolutionary biology. In the one case hunter-gatherers are likened to 'economic men' who can work out their strategies for themselves. In the other they are seen as 'optimal foragers' whose strategies have been worked out for them by natural selection. These two characters fall on opposite sides of an overriding opposition between reason and nature, or freedom and necessity. A properly ecological account of hunting and gathering requires however that we dissolve this opposition, showing how people develop their skills and sensitivities through histories of continuing involvement with human and non-human constituents of their environments. For it is by engaging with these manifold constituents that the world comes to be known by its inhabitants.

In Chapter Three, I contrast this view, that hunter-gatherers' perception of the environ-ment is embedded in practices of engagement, with the more conventional alternative that such perception results from the reconstruction of naturally given realities in terms of metaphors drawn from the ideal realm of culture. I develop this contrast through a review, first, of how certain tropical hunter-gatherer peoples perceive their forest environment. Secondly, I look at the way northern hunters, particularly the Cree of northeastern Canada, understand their relations with the animals they hunt. Thirdly, drawing on ethnographic material from Aboriginal Australia and subarctic Alaska, I consider how hunters and gath-erers perceive the landscape. I conclude that anthropological attempts to depict the mode of practical engagement of hunter-gatherers with the world as a mode of cultural construc-tion of it have had the effect of perpetuating a naturalistic vision of the hunter-gatherer economy. This vision of hunters and gatherers as 'living in nature' is closely tied to a certain notion of history, as a process in which human beings have gradually risen above, and brought under control, both their own nature, in the process of civilisation, and the nature around them, in the domestication of animals and plants. In Chapters Four and Five, I revisit this Western historical narrative of the human conquest of nature, and seek to replace it with an alternative more in keeping with indigenous understandings.

Chapter Four focuses on the history of human–animal relations, and on the trans-formation of these relations entailed in the shift from hunting to pastoralism. I argue that relationships between hunters and prey are based on a principle of trust, constituted by a combination of autonomy and dependency. The human–animal relationship under pastoralism, by contrast, is based on a principle of domination. The transition from hunting to pastoralism, therefore, is marked not by the replacement of wild by domesticated animals, but by the movement from trust to domination in the principles of human beings' relations with them. Chapter five continues the critique of the notion of domestication, and with it the dichotomy between collection and production, entailed in the notion of history as the human transformation of nature. In terms of this dichotomy, growing crops and raising animals are viewed as instances of production in the same way as is the

manufacture of artefacts. In every case, things are 'made'. Drawing on ethnographic studies of how people who actually live by tilling the soil or keeping livestock understand the nature of their activity, I show that the work people do does not make plants and animals, but rather establishes the conditions for their growth and development. The distinctions between gathering and cultivation, and between hunting and animal husbandry, thus hinge on the scope of human involvement in establishing these conditions. Moreover, growing plants and raising animals are not so different, in principle, from bringing up children. Contrary to the conventional wisdom that not only animals and plants but also children are 'made', through domestication and socialisation, I conclude that children, animals, plants and even – in a sense – artefacts as well, are 'grown'.

I return, in Chapter Six, to the theme of engagement, and to the different approaches to environmental understanding of indigenous hunters and modern science. There is, as I show, a paradox at the heart of science. For while, on the one hand, it asserts that human beings are biological organisms, composed of the same stuff and having evolved according to the same principles as organisms of every other kind, on the other hand the very possibility of a scientific account rests on the separation of humanity from organic nature. To resolve the paradox I suggest an alternative mode of understanding based on the premise of our engagement with the world, rather than our detachment from it. I do this by drawing on one anthropological study of how people in a non-Western society perceive themselves and the world around them. This is A. Irving Hallowell's classic study of the Ojibwa, indigenous hunters and trappers of the Canadian boreal forest. For the Ojibwa, knowledge is grounded in experience, understood as a coupling of the movement of one's awareness to the movement of aspects of the world. Experience, in this sense, does not mediate between mind and nature, since these are not separated in the first place. It is rather intrinsic to the process of being alive to the world. This is linked to a view of personhood in which the self is seen to inhere in the unfolding of the relations set up by virtue of its positioning in an environment. The essay explores the implications of this view of the self and experience for our understanding of animacy, metamorphosis, dreaming and speech. I conclude that what the Ojibwa have arrived at is not an alternative science of nature but a poetics of dwelling. Far from having been superseded, in the West, by the rise of modern science, such poetics is the necessary ground for all scientific activity.

In Chapter Seven I turn from science to art. Whereas science is often supposed to be a specific historical achievement of the Western world, art is commonly regarded as one of the hallmarks of humanity, revealing a universal capacity to represent experience in symbolic media. I argue against this view. Focusing on the ways in which hunters and gatherers depict animals, in painting, drawing and sculpture, I show that activities leading to the production of what we in the West would call 'art' should be understood not as ways of representing the world of experience on a higher, more symbolic plane, but of probing more deeply into it and discovering the significance that lies there. The argument is developed by way of a comparison between two distinct traditions, of 'painting the ancestors' among Australian Aboriginal peoples and of 'carving the spirits' among the peoples of the circumpolar North. The differences between these traditions reflect contrasting understandings of the relationships between human beings, animals and the land, which I call respectively totemic and animic. The fundamental difference between the totemic and animic depiction of animals is that the former focuses on morphology and anatomy, whereas the latter focuses on posture, movement and behaviour. But while hunters and gatherers have been painting and carving figures of one kind or another for thousands of years, only recently have they begun to engage in the production of 'art'.

To understand the original significance of what they were doing, I argue, we have to cease thinking of painting and carving as modalities of the production of art, and view art instead as a historically specific objectification of painting and carving.

Now it is conventional to describe hunters and gatherers as indigenous inhabitants of the lands in which they live. But precisely what it means to be 'indigenous' is a matter of some controversy. According to one definition, indigenous peoples are the descendants of those who inhabited a country when colonists arrived from elsewhere. Yet while habitation of the land is taken to be the source of indigenous identity, the claim that this identity can be passed on by descent implies that it is no longer drawn from the land at all, but from one's genealogical ancestors. I take up this paradox in Chapter Eight. It hinges, as I show, on the interpretation of five key terms: ancestry, generation, substance, memory and land. I show that the conventional meanings of these terms are linked through their common grounding in what I call the 'genealogical model'. After spelling out the elements of this model, and the assumptions it entails, I argue that it fundamentally misrepresents the ways in which peoples whom *we* class as indigenous constitute their identity, knowledgeability, and the environments in which they live. I suggest an alternative, relational approach to interpreting the key terms which is more consonant with these people's lived experience of inhabiting the land. In this approach, which ties together many of the key arguments of the preceding chapters while laying the groundwork for the ecological and developmental perspectives to be elaborated in Parts II and III, both cultural knowledge and bodily substance are seen to undergo continuous generation in the context of an ongoing engagement with the land and with the beings that dwell therein. I conclude that it is in articulating their experience in a way that is compatible with the discourses of the state that people are led to lay claim to indigenous status, in terms that nevertheless invert their own understandings.

Chapter One

Culture, nature, environment

Steps to an ecology of life

As a social anthropologist whose ethnographic interests lie in the northern circumpolar regions, I should like to begin with an observation drawn from my own field experience of mustering reindeer in Finnish Lapland. When pursuing reindeer, there often comes a critical point when a particular animal becomes immediately aware of your presence. It then does a strange thing. Instead of running away it stands stock still, turns its head and stares you squarely in the face. Biologists have explained this behaviour as an adaptation to predation by wolves. When the reindeer stops, the pursuing wolf stops too, both of them getting their breath back for the final, decisive phase of the episode when the deer turns to flight and the wolf rushes to overtake it. Since it is the deer that takes the initiative in breaking the stalemate, it has a slight head start, and indeed a healthy adult deer can generally outrun a wolf (Mech 1970: 200–3). But the deer's tactic, that gives it such an advantage against wolves, renders it peculiarly vulnerable when encountering human hunters equipped with projectile weapons or even firearms. When the animal turns to face the hunter, it provides the latter with a perfect opportunity to take aim and shoot. For wolves, deer are easy to find, since they travel with the herd, but hard to kill; for humans, to the contrary, deer may be hard to find, but once you have established contact, they are rather easy to kill (Ingold 1980: 53, 67).

Now the Cree people, native hunters of northeastern Canada, have a different explantation for why reindeer – or caribou as they are called in North America – are so easy to kill. They say that the animal offers itself up, quite intentionally and in a spirit of good-will or even love towards the hunter. The bodily substance of the caribou is not taken, it is *received*. And it is at the moment of encounter, when the animal stands its ground and looks the hunter in the eye, that the offering is made. As with many other hunting people around the world, the Cree draw a parallel between the pursuit of animals and the seduction of young women, and liken killing to sexual intercourse. In this light, killing appears not as a termination of life but as an act that is critical to its regeneration.[1]

SCIENCE AND INDIGENOUS KNOWLEDGE

Here, then, we have two accounts – one coming from biological science, the other from indigenous people – of what happens when humans encounter reindeer or caribou. My initial question is: how are we to understand the relation between them? Wildlife biologists are liable to react to native stories about animals presenting themselves of their own accord with a mixture of cynicism and incredulity. The cynical view would be that such stories provide a very handy way of dodging the ethical issues surrounding hunting and killing that cause such anxiety for many people in Western societies. For hunters, it

is most convenient to be able to transfer responsibility for the death of animals onto the animals themselves. What the Western scientist finds hard to believe is that anybody should be taken in by patently fanciful excuses of this kind. The fact of the matter, surely, is that caribou are being tracked down and killed. Could any intelligent person seriously think that animals *actually* offer themselves to hunters as recounted in the stories of the Cree? Are the folk who tell these stories mad, lost in a fog of irrational superstition, talking in allegories, or simply having us on? Whatever the answer may be, science insists that stories are stories, and as such have no purchase on what really goes on in the natural world.

Anthropologists are inclined to take a rather different approach. On being told that the success of hunting depends upon the bestowal of favour by animals, the anthropologist's first concern is not to judge the truth of the proposition but to understand what it means, given the context in which it is advanced. Thus it can readily be shown that the idea of animals offering themselves to hunters, however bizarre it might seem from the viewpoint of Western science, makes perfectly good sense if we start from the assumption (as the Cree evidently do) that the entire world – and not just the world of human persons – is saturated with powers of agency and intentionality. In Cree cosmology, the anthropologist concludes, relations with animals are modelled on those that obtain within the human community, such that hunting is conceived as a moment in an ongoing interpersonal dialogue (Tanner 1979: 137–8, see Gudeman 1986: 148–9, and Chapter Three, pp. 48–52). This is not to say that the biological explanation of the stand-off between hunter and caribou at the point of encounter, as part of an innate response mechanism designed to combat predation by wolves, is without interest. For anthropologists, however, explaining the behaviour of caribou is none of their business. Their concern is rather to show how hunters' direct experience of encounters with animals is given form and meaning within those received patterns of interconnected images and propositions that, in anthropological parlance, go by the name of 'culture'.

Though from what I have just said, the perspectives of the wildlife biologist and the cultural anthropologist might seem incompatible, they are nevertheless perfectly complementary, and indeed disclose a common, albeit practically unattainable, point of observation.[2] Whereas the biologist claims to study organic nature 'as it really is', the anthropologist studies the diverse ways in which the constituents of the natural world figure in the imagined, or so-called 'cognised' worlds of cultural subjects. There are any number of ways of marking this distinction, but of these the most notorious, at least in anthropological literature, is that between so-called 'etic' and 'emic' accounts. Derived from the contrast in linguistics between phonetics and phonemics, the former purports to offer a wholly neutral, value-free description of the physical world, while the latter spells out the specific cultural meanings that people place upon it.

There are two points I want to make about this distinction. First, to suggest that human beings inhabit discursive worlds of culturally constructed significance is to imply that they have already taken a step out of the world of nature within which the lives of all other creatures are confined. The Cree hunter, it is supposed, narrates and interprets his experiences of encounters with animals in terms of a system of cosmological beliefs, the caribou does not. But, secondly, to perceive this system *as* a cosmology requires that we observers take a further step, this time out of the worlds of culture in which the lives of all other *humans* are said to be confined. What the anthropologist calls a cosmology is, for the people themselves, a lifeworld. Only from a point of observation beyond culture is it possible to regard the Cree understanding of the relation between hunters and caribou as

but one possible construction, or 'modelling', of an independently given reality. But by the very same token, only from such a vantage point is it possible to apprehend the given reality for what it is, independently of any kind of cultural bias.

It should now be clear why natural science and cultural anthropology converge on a common vertex. The anthropological claim of perceptual relativism – that people from different cultural backgrounds perceive reality in different ways since they process the same data of experience in terms of alternative frameworks of belief or representational schemata – does not undermine but actually reinforces the claim of natural science to deliver an authoritative account of how nature really works. Both claims are founded upon a double disengagement of the observer from the world. The first sets up a division between humanity and nature; the second establishes a division, within humanity, between 'native' or 'indigenous' people, who live in cultures, and enlightened Westerners, who do not. Both claims, too, are underwritten by a commitment that lies at the heart of Western thought and science, to the extent of being its defining feature. This is the commitment to the ascendancy of abstract or universal reason. If it is by the capacity to reason that humanity, in this Western discourse, is distinguished from nature, then it is by the fullest development of this capacity that modern science distinguishes itself from the knowledge practices of people in 'other cultures' whose thought is supposed to remain somewhat bound by the constraints and conventions of tradition. In effect, the sovereign perspective of abstract reason is a product of the compounding of two dichotomies: between humanity and nature, and between modernity and tradition.

The result is not unlike that produced by perspective painting, in which a scene is depicted from a point of view which itself is given independently of that of the spectator who contemplates the finished work. Likewise abstract reason can treat, as objects of contemplation, diverse worldviews, each of which is a specific construction of an external reality (Figure 1.1). The anthropologist, surveying the tapestry of human cultural variation, is like the visitor to the art gallery – a 'viewer of views'. Perhaps it is no accident that both perspective painting and anthropology are products of the same trajectory of Western thought (Ingold 1993a: 223–4).
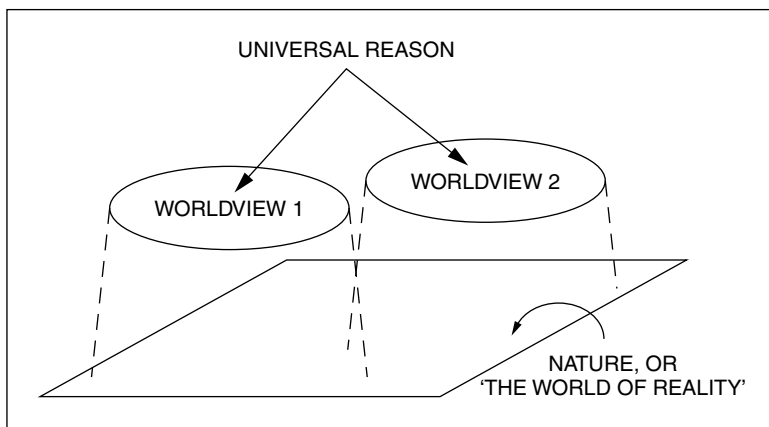
Figure 1.1 The sovereign perspective of abstract or universal reason, which treats the lifeworlds of people of different cultures as alternative constructions, cosmologies or 'worldviews', superimposed upon the 'real' reality of nature. From this perspective, anthropology embarks on the comparative study of cultural world-views, while science investigates the workings of nature.

MIND AND NATURE: GREGORY BATESON AND CLAUDE LÉVI-STRAUSS

We have now reached the stage at which I can introduce the terms comprising the title of this chapter. I have observed that the possibility of an objective account of such natural phenomena as the behaviour of caribou, as well as the recognition of an indigenous account, such as that of the Cree, as fitting within a particular culture-specific cosmology, depend on a two-step movement of disengagement that cuts out first nature, then culture, as discrete objects of attention. Whereas the scientific account is attributed to disinterested observation and rational analysis, the indigenous account is put down to the accommodation of subjective experience within 'beliefs' of questionable rationality. What I wish to do now is to retrace the two steps in the reverse direction. Only by doing so, I maintain, can we level the ranking, implicit in what has been said up to now, of scientific over indigenous accounts. Moreover I believe it is necessary that we take these steps, that we descend from the imaginary heights of abstract reason and resituate ourselves in an active and ongoing engagement with our environments, if we are ever to arrive at an ecology that is capable of recovering the reality of the life process itself. In short, my aim is to replace the stale dichotomy of nature and culture with the dynamic synergy of organism and environment, in order to regain a genuine ecology of life. This ecology, however, will look very different from the kind that has become familiar to us from scientific textbooks. For it comprises a kind of knowledge that is fundamentally resistant to transmission in an authorised textual form, independently of the contexts of its instantiation in the world.

The subtitle of this chapter, 'steps to an ecology of life', is borrowed from the work of Gregory Bateson (1973). I have, however, substituted 'life' for 'mind' as it appears in the title of Bateson's famous collection of essays. This substitution is deliberate. Bateson was a great dismantler of oppositions – between reason and emotion, inner and outer, mind and body. Yet curiously, he seemed unable to shake off the most fundamental opposition of all, between form and substance. His objection to mainstream natural science lay in its reduction of 'real' reality to pure substance, thus relegating form to the illusory or epiphenomenal world of appearances. This he saw as the inevitable consequence of the false separation of mind and nature. Bateson thought that mind should be seen as immanent in the whole system of organism–environment relations in which we humans are necessarily enmeshed, rather than confined within our individual bodies *as against* a world of nature 'out there'. As he declared, in a lecture delivered in 1970,[3] 'the mental world – the mind – the world of information processing – is not limited by the skin' (Bateson 1973: 429). Yet the ecosystem, taken in its totality, was nevertheless envisaged as two-faced. One face presents a field of matter and energy, the other presents a field of pattern and information; the first is all substance without form, the second is all form detached from substance. Bateson likened the contrast to one which Carl Jung, in his *Seven Sermons to the Dead*, had drawn between the two worlds of the *pleroma* and the *creatura*. In the former there are forces and impacts but no differences; in the latter there are only differences, and it is these differences that have effects (Bateson 1973: 430–1). Corresponding to this duality Bateson recognised two ecologies: an ecology of material and energy exchanges, and an ecology of ideas. And it was this second ecology that he christened the 'ecology of mind'.

To bring out the full significance of Bateson's position, it is instructive to set it alongside that of another giant of twentieth-century anthropology, Claude Lévi-Strauss. In a lecture on 'structuralism and ecology' – delivered in 1972, just two years after the Bateson
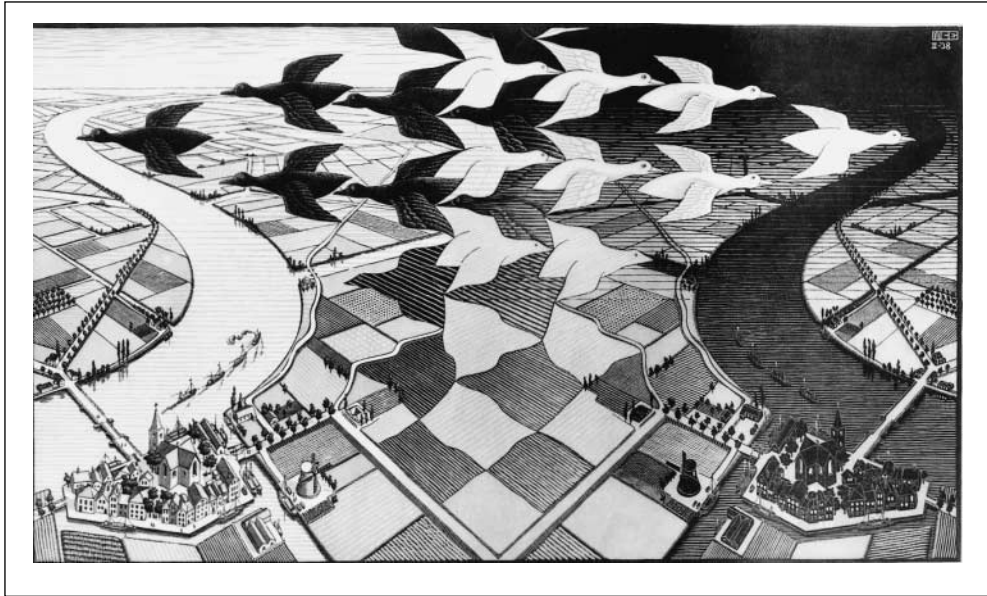
Figure 1.2 'Day and night' (1938), a woodcut by the Dutch artist M. C. Escher, aptly illustrates, in visual form, the way in which the mind – according to Lévi-Strauss – works upon the data of perception. Drawing upon a selection of recognisable and familiar features of the environment, such as houses, fields, a river, flying swans, the mind casts them into a symmetrical structure of oppositions and contrasts: day/night, left/right, city/country, water/land.

lecture to which I have just referred – Lévi-Strauss likewise set out to demolish the classical dichotomy between mind and nature.[4] Although neither of the two figures made any reference to the other's work, there are some superficial resemblances between their respective arguments. For Lévi-Strauss, too, the mind is a processor of information, and information consists in patterns of significant difference. Unlike Bateson, however, Lévi-Strauss anchors the mind very firmly in the workings of the human brain. Fastening in a more or less arbitrary fashion upon certain elements or distinctive features that are presented to it in the surrounding environment, the mind acts rather like a kaleidoscope, casting them into patterns whose oppositions and symmetries reflect underlying universals of human cognition (Figure 1.2). It is by these interior patterns that the mind possesses knowledge of the world outside. If, in the final analysis, the distinction between mind and nature is dissolved, it is because the neurological mechanisms that underwrite the mind's apprehension of the world are part of the very world that is apprehended. And this world, according to Lévi-Strauss, is structured through and through, from the lowest level of atoms and molecules, through the intermediate levels of sensory perception, to the highest levels of intellectual functioning. 'When the mind processes the empirical data which it receives previously processed by the sense organs', Lévi-Strauss concluded, 'it goes on working out structurally what at the outset was already structural. And it can only do so in as much as the mind, the body to which the mind belongs, and the things which body and mind perceive, are part and parcel of one and the same reality' (1974: 21).

In all these respects, Bateson's position could not have been more different. For Lévi-Strauss ecology meant 'the world outside', mind meant 'the brain'; for Bateson both
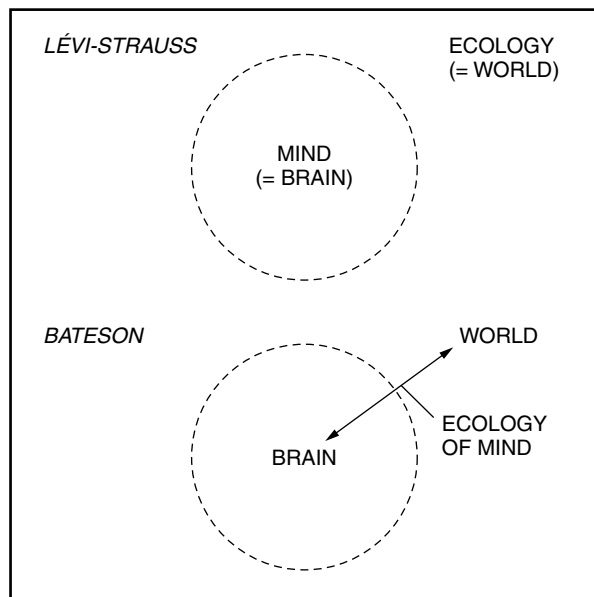
Figure 1.3   Schematic comparison of Lévi-Strauss's and Bateson's views on mind and ecology.

mind and ecology were situated in the *relations between* the brain and the surrounding environment (Figure 1.3). For Lévi-Strauss, the perceiver could only have knowledge of the world by virtue of a passage of information across the boundary between outside and inside, involving successive steps of encoding and decoding by the sense organs and the brain, and resulting in an inner mental representation. For Bateson the idea of such a boundary was absurd, a point he illustrated with the example of the blind man's cane (1973: 434). Do we draw a boundary around his head, at the handle of the cane, at its tip, or halfway down the pavement? If we ask where the mind is, the answer would not be 'in the head rather than out there in the world'. It would be more appropriate to envisage mind as extending outwards into the environment along multiple sensory pathways of which the cane, in the hands of the blind man, is just one. Thus while Bateson shared with Lévi-Strauss the notion of mind as a processor of information, he did not regard processing as a step-by-step refinement or repackaging of sensory data already received, but rather as the unfolding of the whole system of relations constituted by the multi-sensory involvement of the perceiver in his or her environment.

To continue with the example of the blind man, it is as though his processing of information were tantamount to his own movement – that is, to his own *processing* through the world. The point about movement is critical. For Lévi-Strauss, both the mind and the world remain fixed and immutable, while information passes across the interface between them. In Bateson's account, by contrast, information only exists thanks to the movement of the perceiver relative to his or her surroundings. Bateson constantly emphasised that stable features of the world remain imperceptible unless we move in relation to them: if the blind man picks up surface features of the road ahead by sweeping his cane from side to side, people with normal vision do the same with their eyes. Through this scanning movement we *draw* distinctions, in the sense not of representing them graphically, but of 'pulling them out'.[5] Whereas Lévi-Strauss often writes as though the world were sending coded messages to the brain, which it then recovers through an operation of decoding, for Bateson the world opens out to the mind through a process of revelation. This distinction, between decoding and revelation, is critical to my argument, and I shall return to it shortly. First, however, a few words are needed on the subject of *life*.

THE ECOLOGY OF LIFE

My leading question is one from which Bateson also set out. 'What sort of thing is this', he asked, 'which we call "organism plus environment"?' (Bateson 1973: 423). But the answer at which I have arrived is different. I do not think we need a separate ecology of

mind, distinct from the ecology of energy flows and material exchanges. We *do* however need to rethink our understanding of life. And at the most fundamental level of all, we need to think again about the relation between form and process. Biology is – or at least is supposed to be – the science of living organisms. Yet as biologists gaze into the mirror of nature, what they see – reflected back in the morphology and behaviour of organisms – is their own reason. Accordingly, they are inclined to impute the principles of their science to the organisms themselves, as though each embodied a formal specification, programme or building plan, a *bio-logos*, given independently and in advance of its development in the world. Indeed the possibility of such a context-independent specification is an essential condition for Darwinian theory, according to which it is this specification – technically known as the genotype – that is said to undergo evolution through changes in the frequency of its information-bearing elements, the genes.

But if the underlying architecture of the organism were thus pre-specified, then its life-history could be nothing more than the realisation or 'writing out' of a programme of construction, under given environmental conditions. Life, in short, would be purely consequential, an effect of the injection of prior form into material substance. I take a different view (Ingold 1990: 215). Organic life, as I envisage it, is active rather than reactive, the creative unfolding of an entire field of relations within which beings emerge and take on the particular forms they do, each in relation to the others. Life, in this view, is not the realisation of pre-specified forms but the very process wherein forms are generated and held in place. Every being, as it is caught up in the process and carries it forward, arises as a singular centre of awareness and agency: an enfoldment, at some particular nexus within it, of the generative potential that is life itself. (This argument is further developed in Chapter Twenty-one, pp. 383–5.)

I can now spell out more precisely what I mean by an 'ecology of life'. It all hinges on a particular answer to Bateson's question: what is this 'organism plus environment'? For conventional ecology, the 'plus' signifies a simple addition of one thing to another, both of which have their own integrity, quite independently of their mutual relations. Thus the organism is specified genotypically, prior to its entry into the environment; the environment is specified as a set of physical constraints, in advance of the organisms that arrive to fill it. Indeed the ecology of the textbooks could be regarded as profoundly *anti*-ecological, insofar as it sets up organism and environment as mutually exclusive entities (or collections of entities) which are only subsequently brought together and caused to interact. A properly ecological approach, to the contrary, is one that would take, as its point of departure, the whole-organism-in-its-environment. In other words, 'organism plus environment' should denote not a compound of two things, but one indivisible totality. That totality is, in effect, a developmental system (cf. Oyama 1985), and an ecology of life – in my terms – is one that would deal with the dynamics of such systems. Now if this view is accepted – if, that is, we are prepared to treat form as *emergent* within the life-process – then, I contend, we have no need to appeal to a distinct domain of mind, to *creatura* rather than *pleroma*, to account for pattern and meaning in the world. We do not, in other words, have to think of mind or consciousness as a layer of being over and above that of the life of organisms, in order to account for their creative involvement in the world. Rather, what we may call mind is the cutting edge of the life process itself, the ever-moving front of what Alfred North Whitehead (1929: 314) called a 'creative advance into novelty'.

A NOTE ON THE CONCEPT OF ENVIRONMENT

Armed with this approach to the ecology of life, I shall now return to the question of how human beings perceive the world around them, and to see how we might begin to build an alternative to the standard anthropological account of environmental perception as a cultural construction of nature, or as the superimposition of layers of 'emic' significance upon an independently given, 'etic' reality. Before we begin, however, I want to make three preliminary points about the notion of environment. First, 'environment' is a relative term – relative, that is, to the being whose environment it is. Just as there can be no organism without an environment, so also there can be no environment without an organism (Gibson 1979: 8, Lewontin 1982: 160). Thus *my* environment is the world as it exists and takes on meaning in relation to me, and in that sense it came into existence and undergoes development with me and around me. Secondly, the environment is never complete. If environments are forged through the activities of living beings, then so long as life goes on, they are continually under construction. So too, of course, are organisms themselves. Thus when I spoke above of 'organism plus environment' as an indivisible totality, I should have said that this totality is not a bounded entity but a *process* in real time: a process, that is, of growth or development.

The third point about the notion of environment stems from the two I have just made. This is that it should on no account be confused with the concept of nature. For the world can exist as nature only for a being that does not belong there, and that can look upon it, in the manner of the detached scientist, from such a safe distance that it is easy to connive in the illusion that it is unaffected by his presence. Thus the distinction between environment and nature corresponds to the difference in perspective between seeing ourselves as beings *within* a world and as beings *without* it. Moreover we tend to think of nature as external not only to humanity, as I have already observed, but also to history, as though the natural world provided an enduring backdrop to the conduct of human affairs. Yet environments, since they continually come into being in the process of our lives – since we shape them as they shape us – are themselves fundamentally historical. We have, then, to be wary of such a simple expression as 'the natural environment', for in thus conflating the two terms we already imagine ourselves to be somehow *beyond* the world, and therefore in a position to intervene in its processes (Ingold 1992a).

COMMUNICATION AND REVELATION

When I was a child my father, who is a botanist, used to take me for walks in the countryside, pointing out on the way all the plants and fungi – especially the fungi – that grew here and there. Sometimes he would get me to smell them, or to try out their distinctive tastes. His manner of teaching was to show me things, literally to point them out. If I would but notice the things to which he directed my attention, and recognise the sights, smells and tastes that he wanted me to experience because they were so dear to him, then I would discover for myself much of what he already knew. Now, many years later, as an anthropologist, I read about how people in Australian Aboriginal societies pass their knowledge across the generations. And I find that the principle is just the same!

In his classic study of the Walbiri of Central Australia, Mervyn Meggitt describes how a boy being prepared for initiation would be taken on a 'grand tour', lasting two or three months. Accompanied by a guardian (a sister's husband) and an elder brother, the boy was taken from place to place, learning as he went about the flora, fauna and topography

of the country, while being told (by the elder brother) of the totemic significance of the various localities visited (Meggitt 1962: 285). Every locality has its story, telling of how it was created through the earth-shaping activities of ancestral beings as they roamed the country during the formative era known as the Dreaming. Observing the waterhole while the story of its formation is related or enacted, the novice witnesses the ancestor coming out of the ground; likewise, casting his eyes over the distinctive outline of a hill or rocky outcrop, he recognises in it the congealed form of the ancestor as it lies down to rest. Thus are truths immanent in the landscape, the truths of the Dreaming, gradually revealed to him, as he proceeds from the most superficial, 'outside' level of knowledge to deeper, 'inside' understanding.[6]

Did my father's knowledge of plants and fungi, or the Aboriginal elder's knowledge of the Dreaming, take the form of a set of interconnected beliefs and propositions inside his head? Is it through the transfer of such beliefs and propositions from one generation to the next that we learn to perceive the world in the way we do? If so – if all knowledge is cradled within the mind – why should so much importance be placed on ensuring that novices should see or otherwise experience for themselves the objects or features of the physical world?

One answer might be to suggest that it is through its inscription in such objects or features – plants and fungi, waterholes and hills – that cultural knowledge is transmitted. These objects would accordingly figure as vehicles, or carriers, for meanings that are, so to speak, 'pinned on', and that together constitute a specific cultural worldview or cosmology (Wilson 1988: 50). In other words, cultural forms would be encoded in the landscape just as, according to the standard semiological approach to linguistic significa-tion, conceptual representations are encoded in the medium of sound. The great Swiss linguist Ferdinand de Saussure, who laid the foundation for this approach, argued that a sign is essentially the union of two things, a signifier and a signified, and that the rela-tion between them is established through the mapping of one system of differences on the plane of ideas onto another system of differences on the plane of physical substance (Saussure 1959: 102–22). As sounds stand for concepts, so – by the same logic – fungi (for my father) or waterholes (for the Aboriginal elder) would stand as signifiers for elements of a comprehensive system of mental representations. Was my father, then, communi-cating his knowledge to me by encoding it in the fungi? Do Aboriginal elders transmit ancestral wisdom by encoding it in hills and waterholes?

Strange as it may seem, much anthropological analysis of the cultural construction of the environment proceeds from this assumption. Yet if the idea of encoding beliefs in fungi sounds bizarre, as indeed it is, the idea of the Dreaming as a cosmology encoded in the landscape is no less so. My father's purpose, of course, was to introduce me to the fungi, not to communicate by way of them, and the same is true of the purpose of Aboriginal elders in introducing novices to significant sites. This is not to deny that infor-mation may be communicated, in propositional or semi-propositional form, from generation to generation. But information, in itself, is not knowledge, nor do we become any more knowledgeable through its accumulation. Our knowledgeability consists, rather, in the capacity to situate such information, and understand its meaning, within the context of a direct perceptual engagement with our environments. And we develop this capacity, I contend, by having things *shown* to us.

The idea of showing is an important one. To show something to somebody is to cause it to be seen or otherwise experienced – whether by touch, taste, smell or hearing – by that other person. It is, as it were, to lift a veil off some aspect or component of the

environment so that it can be apprehended directly. In that way, truths that are inherent in the world are, bit by bit, revealed or disclosed to the novice. What each generation contributes to the next, in this process, is an *education of attention* (Gibson 1979: 254). Placed in specific situations, novices are instructed to feel this, taste that, or watch out for the other thing. Through this fine-tuning of perceptual skills, meanings immanent in the environment – that is in the relational contexts of the perceiver's involvement in the world – are not so much constructed as discovered.

It could be said that novices, through their sensory education, are furnished with keys to meaning. But the metaphor of the key has to be used with some care. I do not have in mind the kind of key – analogous to a cipher – that might enable me to translate from physical signifiers to mental ideas and thereby to come into possession of the cultural knowledge of my forefathers through a reverse decoding of what they, in their turn, had encoded in the landscape. There is, indeed, a rather fundamental circularity in the notion that cultural knowledge is transmitted across generations by means of its encoding in material symbols. For without the key it is impossible for the novice to read off the cultural message from salient features of the physical world. Yet unless the message has already been thoroughly understood, it is impossible to extract the key. How can features of the landscape figure as elements of a communicative code if, in order to crack the code, you must already know what is to be communicated thereby?

When the novice is brought into the presence of some component of the environment and called upon to attend to it in a certain way, his task, then, is not to decode it. It is rather to discover for himself the meaning that lies within it. To aid him in this task he is provided with a set of keys in another sense, not as ciphers but as *clues* (see Chapter Eleven, p. 208). Whereas the cipher is centrifugal, allowing the novice to access meanings that are attached ('pinned on') by the mind to the outer surface of the world, the clue is centripetal, guiding him towards meanings that lie at the heart of the world itself, but which are normally hidden behind the facade of superficial appearances. The contrast between the key as cipher and the key as clue corresponds to the critical distinction, to which I have already drawn attention, between decoding and revelation. A clue, in short, is a landmark that condenses otherwise disparate strands of experience into a unifying orientation which, in turn, opens up the world to perception of greater depth and clarity.[7] In this sense, clues are keys that unlock the doors of perception, and the more keys you hold, the more doors you can unlock, and the more the world opens up to you. My contention is that it is through the progressive acquisition of such keys that people learn to perceive the world around them.

FORM AND FEELING

When Susanne Langer gave the title *Philosophy in a New Key* to her influential book on art and aesthetics (Langer 1957), she was of course using the metaphor of the key in yet another sense, here referring to a kind of register of understanding, akin to the key of musical notation. In the book, Langer contends that the meaning of art should be found in the art object itself, as it is *presented* to our awareness, rather than in what it might be supposed to *represent* or signify. If people in Western societies find this hard to grasp, it is because they are so used to treating art as somehow representative of something else – for we expect every picture to have a title – that the ways in which we respond to objects or performances themselves are forever getting confused with our responses to whatever they are supposed to stand for. One way around this difficulty, Langer suggests, is to

concentrate on the kind of art that – at least for Westerners – is apparently *least* representational, namely music. Music, surely, can stand for nothing but itself, so that an investigation of musical meaning should be able to show how meaning can reside in art as such. 'If the meaning of art belongs to the sensuous percept itself apart from what it ostensibly represents', writes Langer, 'then such purely artistic meaning should be most accessible through musical works' (1957: 209). Pursuing this line of argument, Langer suggests that 'what music can actually reflect is . . . the morphology of feeling' (p. 238).

I believe this idea can be generalised, so long as we recognise that feeling is a mode of active, perceptual engagement, a way of being literally 'in touch' with the world. The craftsman feels his raw material, as the potter feels clay or the turner feels wood, and out of that process of feeling there emerges the form of the vessel. Likewise, the orchestral musician feels – or rather watches – the gestures of the conductor, and out of that feeling comes a phrase shaped in sound. Or more generally, *art gives form to human feeling*; it is the shape that is taken by our perception of the world, guided as it is by the specific orientations, dispositions and sensibilities that we have acquired through having had things pointed out or shown to us in the course of our sensory education.

While on the subject of music, let me give you one example of what I mean, taken from an essay by my favourite composer, Leoš Janáček. Here, Janáček writes of how, on one occasion, he stood on the seashore and notated the sounds of the waves. The waves 'shout', 'bubble', and 'yell' (Janáček 1989: 232). Figure 1.4 is a reproduction of what he

> I stand on the shore at high tide. The swarm of waves rises higher and higher; every wave shouts out its own motif:
>
> This one bubbles:
>
> That one yells:
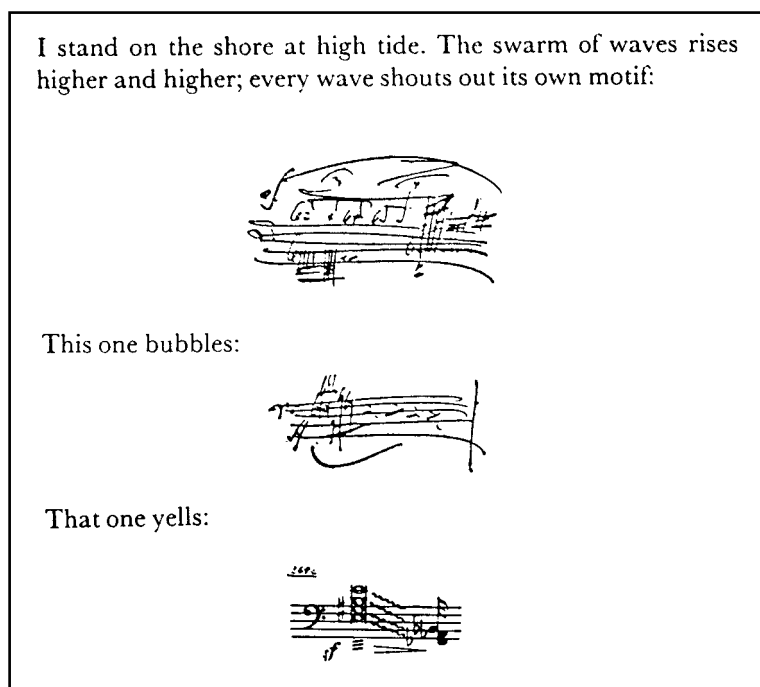
Figure 1.4   Janáček's sketches of the sounds of the waves, as he stood on the shore at the Dutch port of Flushing in 1926 (taken from his essay 'The sea, the land', in Janáček 1989: 229–34).

From *Janáček's Uncollected Essays on Music*, Selected, Edited and Translated by Mirka Zemanová, published by Marion Boyars Publishers of London and New York, 1989, p. 232.

put in his notebook. Now these musical sketches are no mere mechanical record of the sounds as they impinged on his ears. For Janáček is not just hearing, he is *listening*. That is to say, his perception is grounded in an act of attention. Like watching and feeling, listening is something people *do* (see Chapter Fourteen, p. 277). In his act of attention, the movement of the composer's consciousness resonates with the sounds of the waves, and each sketch gives form to that movement.

But Janáček teaches us something more. Throughout his career, he was a compulsive collector of what he called 'speech-melodies'. He scribbled down the melodic form of snippets of speech heard from all kinds of people in all manner of activities: a house-keeper calling to her chickens as she scatters grain, an old man grumbling as he goes to work, children at play, and so on. But these jottings were not confined to human sounds. Speech, for Janáček, was a kind of song, and so were all the other sounds that resonate with our consciousness, from the noises of the waves, through the tolling of an old rusty bell or the ominous sound of a burst water-pipe, to the clucking of hens in the farmyard and the 'bloodthirsty nocturne' of a mosquito.[8] Are we to suppose, then, that in these melodies, nature is trying to communicate with us, to send us messages encoded in patterns of sound? Janáček's point was quite the opposite. It was that we should cease thinking of the sounds of speech merely as vehicles of symbolic communication, as serving to give outward expression to inner states such as beliefs, propositions or emotions. For sound, as Janáček wrote, 'grows out of our entire being ... *There is no sound that is broken away from the tree of life*' (1989: 88, 99, original emphasis).

Let me put this another way. The waves, says Janáček, shout and yell. So, sometimes, do people. When you yell in anger, the yell *is* your anger, it is not a vehicle that *carries* your anger. The sound is not broken off from your mental state and despatched like a message in a bottle cast upon the ocean of sound in the hope that someone might pick it up. The echoes of the yell are the reverberations of your own being as it pours forth into the environment. Maurice Merleau-Ponty, in his *Phenomenology of Perception*, caught the point precisely in his observation that your yell '*does not make me think of anger*, it is anger itself' (1962: 184, original emphasis). And if people pour out their being in the melodies of speech, so the waves pour out theirs in the sounds we describe as foaming and crashing, and the hens pour out theirs in their endless clucking. Thus to take one more hint from Janáček, song – any song, any singing – 'is something from which we are to learn the truth of life' (1989: 89). This is why Aboriginal people sing their songs of the Dreaming, songs which give form to their feeling for the country around them.

CONCLUSION: TOWARDS A SENTIENT ECOLOGY

I have not forgotten the Cree hunter and the caribou, and to wrap up my argument, I now want to return to them. The hunter, let us say, can *tell*. He can do so in two ways. First, he is a perceptually skilled agent, who can detect those subtle clues in the environ-ment that reveal the movements and presence of animals: thus he can 'tell' where the animals are. Secondly, he is able to narrate stories of his hunting journeys, and of his encounters with animals. But in doing so, in telling in this other sense, he is no more aiming to produce a record or transcription of what happened than was Janáček, when he wrote down the sounds of the waves. When the hunter speaks of how the caribou presented itself to him, he does not mean to portray the animal as a self-contained, rational agent whose action in giving itself up served to give outward expression to some inner resolution. Like music, the hunter's story is a performance; and again like music, its aim

is to give form to human feeling – in this case the feeling of the caribou's vivid proximity as another living, sentient being. At that crucial moment of eye-to-eye contact, the hunter *felt* the overwhelming presence of the animal; he felt as if his own being were somehow bound up or intermingled with that of the animal – a feeling tantamount to love and one that, in the domain of human relations, is experienced in sexual intercourse. In telling of the hunt he gives shape to that feeling in the idioms of speech.

In his recent study of reindeer herders and hunters of the Taimyr region of northern Siberia, David Anderson (2000: 116–17) writes that in their relations with animals and other components of the environment, these people operate with a *sentient ecology*. This notion perfectly captures the kind of knowledge people have of their environments that I have been trying to convey. It is knowledge not of a formal, authorised kind, transmissible in contexts outside those of its practical application. On the contrary, it is based in feeling, consisting in the skills, sensitivities and orientations that have developed through long experience of conducting one's life in a particular environment. This is the kind of knowledge that Janáček claimed to draw from attending to the melodic inflections of speech; hunters draw it from similarly close attention to the movements, sounds and gestures of animals.

Another word for this kind of sensitivity and responsiveness is *intuition*. In the tradition of Western thought and science, intuition has had a pretty bad press: compared with the products of the rational intellect, it has been widely regarded as knowledge of an inferior kind. Yet it is knowledge we all have; indeed we use it all the time as we go about our everyday tasks (Dreyfus and Dreyfus 1986: 29). What is more, it constitutes a necessary foundation for any system of science or ethics. Simply to exist as sentient beings, people must already be situated in a certain environment and committed to the relationships this entails. These relationships, and the sensibilities built up in the course of their unfolding, underwrite our capacities of judgement and skills of discrimination, and scientists – who are human too – depend on these capacities and skills as much as do the rest of us. That is why the sovereign perspective of abstract reason, upon which Western science lays its claim to authority, is practically unattainable: an intelligence that was completely detached from the conditions of life in the world could not think the thoughts it does. It is also why reasoning logically from first principles will not suffice to design an ethical system that actually works. For any judgement that had no basis in intuition, however justified it might be on grounds of 'cold' logic, would carry no practical or motivational force whatever. Where the logic of ethical reasoning, setting out from first principles, leads to results that are counter-intuitive, we do not reject our intuitions but rather change the principles, so that they will generate results which conform more closely to what we *feel* is right.

Intuitive understanding, in short, is not contrary to science or ethics, nor does it appeal to instinct rather than reason, or to supposedly 'hardwired' imperatives of human nature. On the contrary, it rests in perceptual skills that emerge, for each and every being, through a process of development in a historically specific environment. These skills, I maintain, provide a necessary grounding for any system of science or ethics that would treat the environment as an *object* of its concern. The sentient ecology is thus both pre-objective and pre-ethical. I have no wish to devalue the projects of either natural science or environmental ethics, indeed both are probably more needed now than ever before. My plea is simply that we should not lose sight of their pre-objective, pre-ethical foundations. My overriding aim has been to bring these foundations to light. And what these excavations into the formation of knowledge have revealed is not an alternative science, 'indigenous'

rather than Western, but something more akin to a *poetics of dwelling*. It is within the framework of such a poetics, I contend, that Cree tales of animals offering themselves to humans, Aboriginal stories of ancestors emerging from waterholes, Janáček's attempts to notate the sounds of nature and my father's efforts to introduce me to the plants and fungi of the countryside, can best be understood.

Chapter Two

The optimal forager and economic man

INTRODUCTION

Enlightenment thought has proclaimed the triumph of human reason over a recalcitrant nature. As a child of the Enlightenment, neoclassical economics developed as a science of human decision-making and its aggregate consequences, based on the premise that every individual acts in the pursuit of rational self-interest. Whether the postulates of micro-economic theory are applicable to humanity at large, or only to those societies characterised as Western, has been much debated: classic anthropological statements include those of Malinowski – who dismissed as 'preposterous' the assumption that 'man, and especially man on a low level of culture, should be actuated by pure economic motives of enlight-ened self-interest', and Firth – who argued, to the contrary, that 'in some of the most primitive societies known . . . there is the keenest discussion of alternatives in any proposal for the use of resources, of the relative economic advantages of exchange with one party as against another, and the closest scrutiny of the quality of goods which change hands . . . and taking a profit thereby' (Malinowski 1922: 60; Firth 1964: 22, see Schneider 1974: 11–12).

My concern here is not to revisit this old debate. Instead, I want to address the paradox presented by the emergence of an approach within contemporary anthropology which seeks to understand the behaviour of so-called primitive people – or more specifically, hunters and gatherers – not through a direct extension of the principles of formal economics, but through a rather more indirect route. This is to extend to human beings principles already applied in analysing the behaviour of non-human animals, principles that are nevertheless closely modelled on – even to the extent of being identified with – those of economics. The approach in question is known to its practitioners as 'human evolutionary ecology', and it is currently one of the most vigorous areas of research in ecological anthropology.

I aim to show that evolutionary ecology is the precise inverse of microeconomics, just as natural selection is the mirror-image of rational choice. As such, it reproduces in an inverted form the dichotomy between reason and nature that lies at the heart of post-Enlightenment science. But in seeking to account for behaviour in terms of pre-specified and heritable properties of discrete individuals, evolutionary ecology is prevented – despite its claims to the contrary – from developing a truly *ecological* perspective. By this I do not simply mean a perspective that would incorporate external environmental variables as part of the explanation for behaviour. An approach that is genuinely ecological, in my view, is one that would ground human intention and action within the context of an ongoing and mutually constitutive engagement between people and their environments.

Yet such an approach, I argue, calls into question the very foundations of the neo-Darwinian explanatory paradigm.

Suppose you were an advocate of economic formalism in anthropology, and that you were concerned to explain why a particular group of hunters and gatherers should choose to concentrate their efforts on harvesting a certain mix of plant and animal resources. By attaching a utility value to each unit of resource, measured in terms of the satisfaction it yields, you would calculate an optimal strategy of resource procurement, that would yield the highest overall utility relative to time and energy expended. You would then compare this strategy with what the people actually do and, finding a nice fit, you would declare that your model has passed the test of empirical confirmation. Anticipating the 'so what?' challenge of the sceptic, you would conclude that what this proves is that hunters and gatherers are just as capable of making informed choices in their own best interests as anyone else. Reason, you would point out, is a faculty common to all humans, not just 'modern Western' or 'civilised' ones, and it is ethnocentric to imagine that while *we* decide what to do in any given situation on the basis of rational deliberation, *they* are bound in their actions by blind conformity to the received wisdom of cultural convention.

What, then, of non-human animals? They, too, seem to come out with strategies of resource procurement which would look eminently rational, had they worked these strategies out for themselves. But of course, you say, they have not. The animals have had their strategies worked out for them in advance, by the evolutionary force of natural selection. The logic of natural selection is simply as follows: individuals with more efficient resource procurement or foraging strategies will have a reproductive advantage over individuals with less efficient strategies, and since these strategies – or more precisely, the rules or programmes for generating them – are encoded in the materials of heredity, the more efficient strategies will automatically tend to become more firmly established in each generation as their carriers bear proportionally more offspring. Now the point of departure for human evolutionary ecology is that the foraging behaviour of human hunter-gatherers, just like that of their non-human counterparts, can be understood as the application, in specific environmental contexts, of decision rules or 'cognitive algorithms' that have been shaped up through a Darwinian process of variation under natural selection. From this premise has been derived a body of theory, known in the trade as 'optimal foraging theory', consisting of formal models which predict how, under given external conditions, a forager should behave, assuming that the overriding objective is to maximise the balance between the energy intake from harvested resources and the energy costs of procurement.
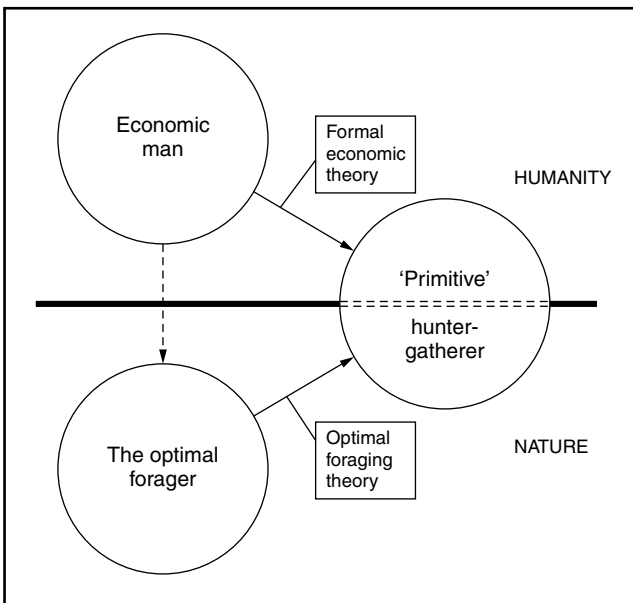
Figure 2.1   The 'primitive' hunter-gatherer conceived as a version of economic man and as a species of optimal forager.

Is the human hunter-gatherer, then, a version of economic man or a species of optimal forager? On the face of it these two figures – both of them, of course, ideal constructs of the analytic imagination – appear diametrically opposed, and their conflation in the archetypal figure of the 'primitive' hunter-gatherer seems to reflect the ambivalent status of this figure, within the discourse of Western science, as transitional between the conditions of nature and humanity (see Figure 2.1). Economic man, surely, exercises his reason in the sphere of social interaction, and in so doing advances in culture or civilisation, against the background of an intrinsically resistant nature. The rationality of the optimal forager, by contrast, is installed at the very heart of nature, while the specifically human domain of society and culture is seen as a source of external normative bias that may cause behaviour to deviate from the optimum. Here, then, is the paradox to which I referred at the outset, of an approach which, while explicitly modelling itself on classical microeconomics, is nevertheless considered applicable to human beings only insofar as their behaviour is in some sense comparable to that of non-human animals. How can we hold, at one and the same time, that the faculty of reason is the distinctive mark of humanity, and that the rationality of human hunter-gatherers, by comparison with that of their non-human counterparts, is compromised by social and cultural constraints? I take this question as my point of departure.

CULTURE AND CHOICE

> Hunters-gatherers, or foragers, live in environments characterised by diverse and heterogeneously distributed resources. From the array of potential food species, foraging locations and pathways, the forager can choose combinations which more or less effectively and efficiently procure subsistence. The forager's choices make up a strategy of adjustment to ecological conditions, an adaptive pattern resulting from evolutionary processes and the constraints of situation, time, and chance.
>
> (Winterhalder 1981a: 66)

This lucid statement, by one of the foremost exponents of optimal foraging theory, takes us directly to the core of the problem. It lies in the contradiction between the notions, on the one hand, that the forager's 'strategy of adjustment' is the result of a series of choices about where to go and what to procure, and on the other hand, that as an 'adaptive pattern' it is the product of an evolutionary process. In explicating this contradiction it helps to have an empirical example in mind, and for this purpose I turn briefly to ethnographic material that Winterhalder himself presents, gathered through fieldwork among Cree people of Muskrat Dam Lake in northern Ontario.

The Cree draw for their subsistence on a variety of large and small mammals, waterfowl and fish, distributed rather sparsely and patchily in an environment which consists of a fine-grained mosaic of different types of dominant vegetation. Not only does the abundance of resource species fluctuate markedly and irregularly from year to year, but the vegetational mosaic also changes in response to climatic variations. The result is that the Cree hunter is unlikely ever to encounter the same conditions from one year to the next (Winterhalder 1981a: 80–1). He has, therefore, to work out his tactics as he goes along. One hunting trip described by Winterhalder exemplifies this point very well. In this trip, ostensibly for beaver trapping, he and his Cree companion came across signs of grouse, moose, wolf, hare, beaver, mink, otter and muskrat. At each sign his companion had to make up his mind whether to pursue the animal in question. In the event, the

grouse was shot, the moose and wolf were ignored, snares were set for the hare and beaver, and traps for the muskrat and otter.

But this hunt, Winterhalder tells us, was an example of an older style of doing things: although the journey from the village to the start of the trail was made by snowmobile, during the hunt itself the companions proceeded on snowshoes. Hunters of the younger generation are making greater use of the snowmobile, not just for getting to the trail but in the course of seeking out animals. The consequent reduction in search times allows them to be far more selective, and to concentrate on taking high-priority species. In the past, the mark of a good hunter was supposed to lie in his ability to handle almost any kind of animal; nowadays, by contrast, younger hunters are said to specialise in hunting just one or two species, and to lack competence in dealing with the others (Winterhalder 1981a: 86–9).

It is clear from this account that hunters are faced with choices, that the choices they make add up to a pattern, and that this pattern changes in response to alterations in the parameters of hunting brought about, for example, by the introduction of new technologies. It is not so clear, however, that the pattern has 'evolved' in the Darwinian sense, or that its emergence has anything to do with the process of natural selection. For the sake of argument let us suppose that in the hunting trip described above, taking account of the expected calorific yield of different resource species and of the energy costs of search and pursuit (or of setting and visiting traps), the hunter's decisions conformed closely to what might be modelled as the optimal strategy for a forager seeking to maximise the net rate of energy gain. And let it also be supposed – rather more problematically – that the households of tactically skilled hunters, being relatively securely provisioned, are also prosperous in terms of the production of healthy offspring: in other words that the hunter's success in the woods is matched by reproductive success at home. There would still be no reason to believe that the successful hunting strategy was the result of an evolutionary process.

It is commonly argued, even by biologists who should know better (e.g. Dunbar 1987), that to show how behaviour of a certain kind has evolved by natural selection, one has only to demonstrate that it contributes positively to the reproductive fitness of those individuals who execute it. This argument is critically incomplete. It misses out the essential link that closes the loop of Darwinian explanation. Behaviour will only evolve by natural selection if, through its effects on reproduction, it contributes to the representation, in successor generations, of a set of instructions or a 'programme' for generating it. In other words, the behaviour must not only have consequences *for* reproduction but also be a consequence *of* the elements that are reproduced (Ingold 1990: 226 fn.9). So far as non-human animals are concerned, the replicated programme elements are usually assumed to be genes. Whatever the merits of this assumption, once our attention turns to human beings it looks decidedly unrealistic. I know of no recent author who has seriously suggested that the behavioural variability apparent from ethnographic studies of human hunter-gatherers might be attributed to inter-populational genetic differences. Instead it is proposed that the instructions underwriting human foraging behaviour are cultural rather than genetic, encoded in words or other symbolic media rather than the 'language' of DNA. As Winterhalder himself has noted (1981b: 17), in the case of human foragers 'information passed from generation to generation by culture provides much of the strategic framework within which specific choices and options are exercised by individuals and groups'.

Does this enculturation model take us any closer to understanding the behaviour of the Cree hunter in the above example? Although in the account the hunter is described

as having made a number of decisions – to shoot this animal, pass up another, lay a trap for a third, and so on – the model would imply that in reality, the scope of his autonomy in decision-making is extremely restricted. He is, after all, merely applying a set of decision rules acquired more or less unselfconsciously from his seniors, and whose prevalence in the society is due not to their perceived efficacy but to the fact that they served his predecessors well, enabling them to bring in the food to support numerous offspring who – following in their fathers' footsteps – reproduced the same strategic steps in their own hunting activities (Boone and Smith 1998: S146). To put the point in more general terms, if a particular strategy of hunting is inscribed within a cultural tradition, and if that tradition has evolved through a process of natural selection, then all the hunter can do is to carry on in the same way, even if changes in environment or technology have had the effect of wiping out its earlier advantages. This is not to say that behaviour is completely prescribed, and genuine choices may still have to be made. But they are made *within* a received strategic framework, they are not about what framework to adopt.

NEO-DARWINIAN BIOLOGY AND NEO-CLASSICAL MICROECONOMICS

Strangely, however, this view of the human forager as the bearer of evolved cultural propensities that cause behaviour to strain towards the optimum coexists, in the writings of evolutionary ecologists, side by side with a quite different picture. Observing that human behaviour often seems far from optimal, the blame for the discrepancy is placed squarely upon culture itself! Thus Winterhalder explicitly singles out 'cultural goals', situated within systems of belief and meaning, as one of the possible reasons for the disjunction, in the human case, 'between modeled optima and observed behaviors' (1981b: 16). Likewise, Foley (1985: 237) lists, as among the consequences of the human capacity for culture, a number of characteristics that 'may inhibit the achievement of optimality'. Nowhere, however, is the contradiction more blatant than in a recent review of optimal foraging theory in its archaeological and anthropological application to human hunter-gatherers, by Robert Bettinger (1991).

Referring back to the classic debate in economic anthropology between advocates of so-called 'formalism' and 'substantivism', Bettinger reminds us that the terms of the debate have their source in Max Weber's (1947: 184–5) distinction between the formal and substantive aspects of human rationality, the first consisting in the element of quantitative calculation or accounting involved in economic decision-making, the second in the subservience of economic activity to ultimate ends or standards of value of a qualitative nature. Without denying the salience of the latter in human affairs, Bettinger argues that formal models have the great advantage of providing a 'yardstick of objective economic rationality', against which it is possible to gauge how far actual behaviour is governed by 'rational, self-interested incentives' as opposed to 'cultural norms and ideas' (Bettinger 1991: 106). And this, he maintains, is precisely what the models of optimal foraging theorists enable one to achieve. The ideal-typical forager of these models is a creature entirely free from cultural constraint to act out of pure, calculated self-interest. Insofar as real human beings are biased by their commitment to 'cultural norms', it is expected that their behaviour will diverge from the optimum.

This puts the Cree hunter in an entirely different light. The received wisdom of his cultural heritage, far from underwriting his ability to come up with an effective strategy, is actually liable to *prevent* him from recognising the best course of action judged in terms of an objective reckoning of costs and benefits. For example, older hunters, strongly

committed to the traditional ideal of spreading their effort across a range of species, continue to practise a broad spectrum style of hunting even when the availability of the snowmobile makes it much more profitable to concentrate on a few preferred, high-yield game animals. By contrast, men of the younger generation, whose commitment to traditional cultural values (at least in the eyes of their seniors) is weak, readily opt for a more specialised strategy. It seems perfectly reasonable to suppose that this strategy is a result of the quite conscious and deliberate decision, on the part of these younger men, *not* to imitate the style of their forefathers. But by the same token, it makes no sense at all to regard it as the outcome of a process of variation under natural selection (Boone and Smith 1998: S146–7).

One cannot avoid the impression that optimal foraging theorists are trying to have it both ways, taking their cue, as it suits them, either from neo-Darwinian evolutionary biology or from neoclassical microeconomics. Indeed in Bettinger's view the fact that optimal foraging theory came to anthropology via biology is more or less incidental – 'it might just as easily have been borrowed from economics' (1991: 83). If that were really so, then the theorems of economics should be as applicable to non-human as to human behaviour, and economic man would have his counterpart among the animals. The 'economic muskrat', for example, would place its own self-preservation before the promptings of its genes, and would choose not to visit the traps laid by the Cree hunter. The following passage, however, gives the game away:

> In Darwinian theories, . . . individuals are essential to explanation: their interests cannot be ignored. It is the self-interested individual that must make *real and metaphorical choices* about reproduction and the selective risks associated with different courses of action
>
> (Bettinger 1991: 152, my emphasis)

Crucially, Bettinger fails to explain what he means by 'metaphorical choices'. We can only surmise that he has in mind the common habit that neo-Darwinian biologists have of speaking *as if* the individual had selected what in fact is built into its *modus operandi* by countless generations of natural selection of which its own constitution is the latest product. The metaphor may have its uses, affording a kind of shorthand, but when reality and metaphor are fused as they are here, the consequences are disastrous.

Are the Cree hunter's choices real or metaphorical? If they are real, then they have not been 'passed on' as part of any inherited schema, whether genetic or cultural, and appeals to natural selection are irrelevant. If, on the other hand, the hunter's behaviour follows a strategy that has evolved through a process of natural selection, albeit working on culturally rather than genetically transmitted characteristics, then strictly speaking, he exercises no more choice in the matter of where to go or what species to pursue than do non-human creatures whose behaviour is presumed to be under genetic control. 'Why', asks Ernst Mayr (1976: 362), 'did the warbler on my summer place in New Hampshire start its southward migration on the night of the 25th August?': his answer is that the bird has an evolved genetic constitution, shaped up 'through many thousands of generations of natural selection', which induces it to respond in this particular way to a specific conjunction of environmental conditions (a reduction in daylight hours coupled with a sudden drop in temperature). Likewise, the muskrat is drawn compulsively into the hunter's trap. And likewise too, according to this selectionist account, the hunter is predisposed to respond appropriately to signs of the presence of animals, as revealed by their tracks, by

pursuing some, laying traps for others, and passing yet others by. He could not have chosen to do other than what he actually does, any more than the muskrat could have chosen not to enter the trap, or the warbler not to migrate. For as a product of 'enculturation', the hunter is as stuck with his heritage as are the muskrat and the bird with their respective sets of genes.

In short, to have recourse to neo-Darwinian theory is to show not how individuals design strategies, but how natural selection designs strategies for individuals to follow. Equipped by virtue of its evolutionary past with a programme for generating more or less optimal behaviour, within an appropriate environmental context, the individual is predestined to execute that behaviour; thus its entire life, judged by its reproductive outcome, becomes just one trial in that protracted and ongoing decision process that is natural selection itself. Stephen Toulmin (1981) refers to this as a process of *populational* adaptation, by contrast to the *calculative* adaptation that results from rational decision making. But as he points out, explanations of adaptive behaviour based on rational choice and on natural selection are not incompatible. Indeed it may be argued that the former actually depend on the latter – in other words, that a prerequisite for any theory of calculative adaptation is an account of human nature which must necessarily be couched in populational terms. I present this argument below.

REASON AND NATURE AS AGENTS OF SELECTION

A formal theory of rational choice, as elaborated in classical microeconomics, predicts what people will do, assuming that their deliberate aim is to obtain the greatest benefit from their actions. The relative benefit to be derived from alternative courses of action can, however, only be evaluated in terms of people's own subjective beliefs and preferences. It may, of course, be possible to derive certain 'lower order' beliefs and preferences from 'higher order' ones. But this process of derivation cannot go on indefinitely. Ultimately, if we want to explain where these beliefs and preferences came from in the first place – if, that is, we seek the source of human intentions – then we have to show how they may have emerged through a history of natural selection. Appeal to human intentionality and rational choice, it is argued, reveals only the *proximate* causes of behaviour, while the *ultimate* cause lies in those selective forces that have furnished individuals both with the fundamental motivations underwriting their choices and with the cognitive mechanisms that allow them to be made. As Boone and Smith observe, 'past genetic (and perhaps cultural) evolution has shaped the human psyche to be very effective at solving adaptive problems, and one important element of the psyche is what we commonly label "intentions" or "goals" or "preferences"' (1998: S152, see also Smith and Winterhalder 1992: 41–50). Thus even if strategies are taken to be products of human reasoning, we have still to resort to natural selection to account for the rationality of the strategists.

Does human evolutionary ecology offer such an account? It does not – indeed it *cannot*, so long as it remains committed to its principal tactic of analysing behaviour in terms of its potential reproductive consequences rather than focusing on the effects of differential reproductive success in establishing the psychological mechanisms that give rise to it. As Symons (1992: 148) has put it, evolutionary ecology is concerned with the *adaptiveness* of behaviour, whereas a properly Darwinian account should be concerned with *adaptation*. That is, it should attempt to show how the most basic goals that human beings seek to achieve, and that motivate their behaviour, have been designed by natural selection under the kinds of environmental conditions experienced by ancestral populations in the

course of the evolution of our species. Such goals, Symons argues, are both species-specific and inflexible, such that their contemporary pursuit, under environments very different from those of the 'environment of evolutionary adaptedness', can lead to behaviour whose consequences are profoundly maladaptive. A taste for sweet things, for example, may have served our hunter-gatherer ancestors well, in establishing a preference for fruit when it is at its most nutritious. But for the more affluent inhabitants of a modern industrial society it can have the less benign consequences of obesity and tooth decay (Symons 1992: 139).

In recent years a new field of study, styling itself as evolutionary psychology, has grown up around the attempt to identify those capacities and dispositions conventionally gathered under the rubric of 'human nature', and to explain how and why they evolved (Barkow, Cosmides and Tooby 1992). This is not the place for a critique of evolutionary psychology, however it is worth noting that its protagonists find themselves at loggerheads with the advocates of evolutionary ecology, despite their common allegiance to the neo-Darwinian paradigm. The difference between them is this: evolutionary ecology seeks to show how behaviour is sensitively responsive to variations in the environment, but lacks a coherent account of human nature; evolutionary psychology seeks to construct just such an account, but in doing so is insensitive to the fine-tuning of human behaviour to environmental conditions. This is not just a difference of emphasis: on behavioural differences as against cognitive universals. The issue is more profound, for behaviour that evolutionary psychology interprets as the product of evolved problem-solving mechanisms in the human mind/brain, is interpreted by evolutionary ecology as the expression of solutions already reached through the mechanism of natural selection, and impressed upon the mind through a process of enculturation.[1] As I intend to argue, neither alternative offers an adequate, ecologically grounded account of how the subsistence skills of hunters and gatherers are acquired and deployed. The problem lies at the heart of the Darwinian paradigm itself.

COGNITIVE ALGORITHMS AND RULES OF THUMB

Let me return for a moment to Winterhalder's ethnography of the Cree of Muskrat Dam Lake. It will be recalled that the environment presents a heterogeneous mosaic of habitat types, which differ in terms of the kinds and relative abundance of the prey species they support. Optimal foraging theory predicts that under these circumstances, hunters will move from patch to patch, sampling what each has to offer, but will drop low-quality patches from their itinerary once it is clear that more is to be gained from concentrating their efforts in high-quality patches despite the extra costs of between-patch travel (MacArthur and Pianka 1966). Where travel costs are high, hunters will tend to be patch-generalists, where they are low they will be patch-specialists. Winterhalder found that the adoption by the Cree of snowmobiles and outboard motors, which greatly reduced the time spent on travel, did indeed favour specialisation. Yet even in the days when everyone moved about on snowshoes, it appears that their itineraries took in relatively few patch types.

To account for this discrepancy, Winterhalder (1981a: 90) proposes that the Cree employ an 'interstice' rather than a 'patch-to-patch' strategy of foraging (see Figure 2.2). It is a strategy that makes good sense when one is hunting animals, such as moose and caribou, which themselves move frequently from one patch to another, which are not particularly abundant in proportion to the number of patches they are associated with, and which leave tracks or trails that may be used by hunters as evidence for their recent movements and present whereabouts. Moving in the interstices between patches – mainly,

that is, on the hard-packed snow of frozen lakes and creeks which in any case makes travel easier – the hunter can expect to intercept the tracks left by animals as they move from patch to patch, and will visit a patch only when the tracks indicate that favoured prey are present there. 'Cree foragers', Winterhalder remarks, 'have developed this technique to a high level of skill' (1981a: 91).

There is no reason to doubt the truth of this remark. My concern is rather with the significance to be attached to the notion of *skill* in this context. For Winterhalder, skill evidently means an ability to produce rapid solutions to ostensibly rather complex problems posed by

Figure 2.2   Alternative foraging strategies in a patchy environment: (A) patch-to-patch foraging; (B) interstice foraging (Winterhalder 1981a: 91).

From Winterhalder and Smith (eds) *Hunter-Gatherer Foraging Strategies*, published by University of Chicago Press 1981.

specific conjunctions of environmental circumstances. Elsewhere, Smith and Winterhalder (1992: 57) suggest that this is done by means of 'rules of thumb'. Clearly, as they point out, the formal mathematical techniques (including geometric tangents, partial derivatives, algebraic inequalities and the like) used in the construction of optimal foraging models are not replicated in the 'everyday decision processes of actors'. Nevertheless, 'simple rules of thumb *or cognitive algorithms* provided by natural or cultural selection may allow them to approach the solution [to a particular foraging problem] quite closely under conditions approximating the environments in which these "short-cuts" evolved' (1992: 58, my emphasis). One such rule, for the Cree hunter, might be stated as follows: 'Proceed along the creek bed until you intercept a track; then, if the track is fresh, search the upland patch to which it leads'. To become skilled, then, the hunter must be equipped with such rules through a process of enculturation.

Now I do not wish to deny that Cree hunters have resort to rules of thumb. I believe, however, that to describe these rules as 'cognitive algorithms' is fundamentally to distort their nature. The notion of cognitive algorithm comes from planning theory, and posits a series of linked decision rules, internal to the actor, which operate on received information to generate plans for subsequent action. As a 'solution' to a perceived 'problem', the plan is supposed to contain a precise and complete specification of the action that is predicated upon it, so that the latter is fully accounted for by the former: to explain what foragers do it is enough to have explained how they decide what to do. The power and utility of rules of thumb, by contrast, rest on the fact that they are inherently vague, specifying little or nothing about the concrete details of action. Invoked against the background of involvement in a real world of persons, objects and relations, rules of thumb may furnish practitioners with a way of talking about what they have done, or about what they mean to do next, but once launched into the action itself they must necessarily fall back on abilities of a quite different kind – namely, on developmentally embodied and environmentally attuned capacities of movement and perception. Rules of thumb, as Suchman (1987: 52) puts it, serve 'to orient you in such a way that you can obtain the
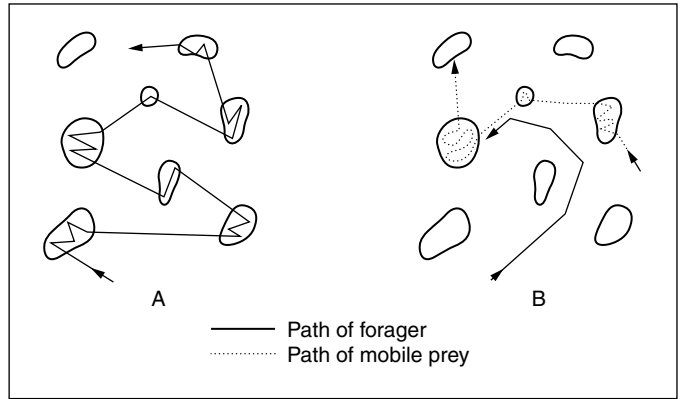
best possible position from which to use those embodied skills on which, in the final analysis, your success depends'. In no sense, however, do they substitute for these skills. Nor, as I shall now show, can we understand the acquisition of technical skills, in successive generations, as a process of enculturation.

ENCULTURATION AND ENSKILMENT

If, as evolutionary ecology would claim, the interstice pattern of foraging has evolved by natural selection as an optimal strategy of resource procurement for hunters and trappers in the boreal forest environment, then it must be expressible in the form of rules and representations that can be transmitted across generations. Let me emphasise once again that there is no question of these rules and representations being encoded genetically. The suggestion is rather that the 'formula' for interstice foraging is contained within a body of cultural information that is passed on, in a manner analogous to genetic transmission, from one generation to the next. According to this analogy, the transmission of cultural information must be distinguished from the experience of its application in particular settings of use, just as the transmission of the constituent elements of the genotype must be distinguished from the latter's realisation, within a particular environment, in the manifest form of the phenotype. This distinction is commonly made by means of a contrast between two forms of learning: social and individual (e.g. Richerson and Boyd 1992: 64, see also Chapter Twenty-one, pp. 386–7). Thus in social learning, the novice absorbs the underlying rules and principles of hunting from already knowledgeable members of the community; in individual learning he puts them to use in the course of his activities in the environment.

Given that social learning occupies such a central place in their theory – as central, indeed, as genetic replication – it is rather surprising that evolutionary ecologists have devoted almost no attention to how it occurs. Consequently, as Hillard Kaplan and Kim Hill are honest enough to admit, 'we know virtually nothing about . . . the developmental processes by which children become adult foragers' (1992: 197). Most often, cultural transmission is viewed as a simple process of imprinting, in which a whole inventory of rules and representations is miraculously downloaded into the passively receptive mind of the novice. It is to precisely this notion of enculturation that evolutionary psychologists have taken exception. Nothing can be acquired, they claim, unless innate processing mechanisms are already in place that serve to decode the signals received from the social environment, and to extract the information contained therein. Thus the traditional model of enculturation, they argue, rests upon an impossible psychology. Not only do innate information-processing mechanisms make the transmission of variable cultural forms possible; they also impose their own structure on what can be learned and how. And it is the evolution of these mechanisms under natural selection, according to evolutionary psychologists, that has to be explained (Tooby and Cosmides 1992: 91–2).

Does this offer an account that is any more convincing? I do not believe that it does, for a simple reason. Human beings are not born with a ready-made architecture of specialised acquisition mechanisms; to the extent that such mechanisms *do* exist, they could only emerge within a process of ontogenetic development. Thus, even if there were such a thing as a 'technology acquisition device' (analogous to the 'language acquisition device' posited by many psycholinguists), it would still have to undergo formation within the very same developmental context in which the child learns the particular skills of his or her community. And if both are aspects of the same developmental process, it is difficult

to see how the learning of the 'acquired' skills can be distinguished from the formation of the 'innate' device (this point is argued at greater length in Chapter Twenty-one). However there is no reason to suppose that anything like a 'technology acquisition device' exists at all. Rather, the learning of technical skills appears to depend on what might be called 'technology acquisition support systems' (Wynn 1994: 153). These systems, as Wynn argues, are not even partly innate. They are rather *systems of apprenticeship*, constituted by the relationships between more and less experienced practitioners in hands-on contexts of activity. And it is on the reproduction of these relationships, not on genetic replication – or the transmission of some analogous code of cultural instructions – that the continuity of a technical tradition depends.

Considering how novice hunters actually learn their trade, two points should be made right away. First, there is no explicit code of procedure, specifying the exact movements to be executed under any given circumstances: indeed practical skills of this kind, as I show in Chapter Nineteen, are just not amenable to codification in terms of any formal system of rules and representations. Secondly, it is not possible, in practice, to separate the sphere of the novice's involvement with other persons from that of his involvement with the non-human environment. The novice hunter learns by accompanying more experienced hands in the woods. As he goes about, he is instructed in what to look out for, and his attention is drawn to subtle clues that he might otherwise fail to notice: in other words, he is led to develop a sophisticated perceptual awareness of the properties of his surroundings and of the possibilities they afford for action. For example, he learns to register those qualities of surface texture that enable one to tell, merely from touch, how long ago an animal left its imprint in the snow, and how fast it was travelling.

We could say that he acquires such know-how by observation and imitation, but not, however, in the sense in which these terms are generally employed by enculturation theorists. Observation is no more a matter of having information copied into one's head, than is imitation a matter of mechanically executing the received intructions. Rather, to observe is actively to attend to the movements of others; to imitate is to align that attention to the movement of one's own practical orientation towards the environment. The fine-tuning of perception and action that is going on here is better understood as a process of enskilment than as one of enculturation (I return to this distinction in Chapter Twenty-three, p. 416; see also Pálsson 1994). For what is involved, as I showed in the last chapter, is not a transmission of representations, as the enculturation model implies, but an education of attention. Indeed, the instructions the novice hunter receives – to watch out for this, attend to that, and so on – only take on meaning in the context of his engagement with the environment. Hence it makes no sense to speak of 'culture' as an independent body of context-free knowledge, that is available for transmission prior to the situations of its application (Lave 1990: 310). And if culture, in this form, exists nowhere save in the heads of anthropological theorists, then the very idea of its evolution is a chimera.

CONCLUSION

In short, a technique such as interstice foraging is not passed on as part of any systematic body of cultural representations; it is rather inculcated in each successive generation through a process of development, in the course of novices' practical involvement with the constituents of their environment – under the guidance of more experienced mentors – in the conduct of their everyday tasks. The accomplished hunter consults the world,

not representations inside his head. The implications of this conclusion cannot be overemphasised, since they strike at the very core of neo-Darwinian theory itself. It is a fundamental premise of this theory that the morphological attributes and behavioural propensities of individual organisms must be specifiable, in some sense, independently and in advance of their entry into relations with their environments, and that the components of these specifications – whether genes or (in humans) their cultural analogues – must be transmissible across generations. It is my contention, to the contrary, that such context-independent specifications are, at best, analytic abstractions, and that in reality the forms and capacities of organisms are the emergent properties of developmental systems (Oyama 1985: 22–3).

We can now see why the attempt to produce a neo-Darwinian evolutionary *ecology* inevitably runs into difficulties. For if morphology and behaviour truly emerge through a history of organism–environment relations, as a properly ecological perspective requires, then they cannot be attributed to a prior design specification that is imported into the environmental context of development. Yet just such an attribution is entailed in the theory of adaptation under natural selection. As we have seen, evolutionary ecologists have tended to evade the problem by focusing on the reproductive consequences of behaviour while remaining agnostic about its developmental causes, thereby substituting the study of adaptiveness for that of adaptation. On the other hand, evolutionary psychologists, adhering more strictly to the neo-Darwinian logic of adaptation, have come up with an account of human nature that is fundamentally *anti*-ecological in its appeal to an 'evolved architecture' that is fixed and universal to the species, regardless of the environmental circumstances in which people happen to grow up.

Let me conclude by returning to the opposition with which I began, between the optimal forager and economic man. Whereas the latter is credited with the capacity to work out his strategies for himself, the former has to have them worked out for him by natural selection. They appear to stand, thus, on opposite sides of an overriding division between reason and nature, freedom and necessity, subjectivity and objectivity. But this is also a dichotomy on which the project of modern natural science depends, and it underwrites the distinction, as it has appeared in the literature of Western anthropology, between the scientist, whose humanity is not in doubt, and the hunter-gatherer who, it would appear, is only contingently human. The scientist – in this case the evolutionary ecologist – constructs an abstract model on the basis of which he can calculate what it would be best for the hunter-gatherer to do; this prediction is then 'tested' against what the hunter-gatherer actually does. If observed practice conforms to the prediction, the model is said to provide an ultimate explanation for the hunter-gatherer's behaviour. Natural selection features, in this account, not as a real-world process but as the reflection of scientific reason in the mirror of nature, providing the theorist with the excuse to parade models *of* behaviour as though they were explanations *for* behaviour.

No amount of appeal, however, to 'methodological individualism', the 'hypothetico-deductive method', or other such contrivances in the analyst's bag of tricks (Smith and Winterhalder 1992, Winterhalder and Smith 1992), will get around the fact that the individuals whose behaviour evolutionary ecologists purport to explain are creatures of their own imagination. The scientific image of hunting and gathering, as a naturally prescribed course of fitness-maximisation, is as illusory as the image that science has of its own enterprise, as a monument to the freedom and pre-eminence of human reason. Far from confronting one another across the boundary of nature, both the people who call themselves scientists and the people whom scientists call hunter-gatherers are fellow passengers

in this world of ours, who carry on the business of life and, in so doing, develop their capacities and aspirations, within a continuing history of involvement with both human and non-human components of their environments. If we are to develop a thoroughgoing ecological understanding of how real people relate to these environments, and of the sensitivity and skill with which they do so, it is imperative to take this condition of involvement as our point of departure. Yet to achieve this, as I have shown, will require nothing less than a fundamental overhaul of evolutionary theory itself.

Chapter Three

Hunting and gathering as ways of perceiving the environment

That nature is a cultural construction is an easy claim to make, and it is one that figures prominently in recent anthropological literature. It is not so easy, however, to ascertain what might be meant by it. One of my principal objectives in this chapter is to demonstrate that this claim is incoherent. To illustrate my argument I shall consider the anthropological treatment of those peoples classically regarded as operating within a natural economy, namely societies of hunters and gatherers. Comparing this treatment with the understandings that people who actually live by hunting and gathering have of themselves and their environments, I shall show that the latter systematically reject the ontological dualism of that tradition of thought and science which – as a kind of shorthand – we call 'Western', and of which the dichotomy between nature and culture is the prototypical instance. I propose that we take these hunter-gatherer understandings seriously, and this means that far from regarding them as diverse cultural constructions of reality, alternative to the Western one, we need to think again about our *own* ways of comprehending human action, perception and cognition, and indeed about our very understanding of the environment and of our relations and responsibilities towards it. Above all, we cannot rest content with the facile identification of the environment – or at least its non-human component – with 'nature'. For as we saw in Chapter One, the world can only be 'nature' for a being that does not inhabit it, yet only through inhabiting can the world be constituted, in *relation* to a being, as its environment.

NATURE, CULTURE AND THE LOGIC OF CONSTRUCTION

Let me begin by outlining what I take to be a commonly adopted position within social and cultural anthropology. I admit that this has something of the character of a 'straw man', and I am indeed setting it up in order to knock it down. Nevertheless, it is one that has proved remarkably resilient, for reasons that will become clear as we proceed.

Of all species of animals, the argument goes, humans are unique in that they occupy what Richard Shweder (1990: 2) calls 'intentional worlds'. For the inhabitants of such a world, things do not exist 'in themselves', as indifferent objects, but only as they are given form or meaning within systems of mental representations. Thus to individuals who belong to different intentional worlds, the same objects in the same physical surroundings may mean quite different things. And when people act towards these objects, or with them in mind, their actions respond to the ways they are already appropriated, categorised or valorised in terms of a particular, pre-existent design. That design, transmitted across the generations in the form of received conceptual schemata, and manifested physically in the artificial products of their implementation, is what is commonly known as 'culture'.

The environments of human beings, therefore, are culturally constituted. And when we refer to an environment – or more specifically to that part of it consisting of animate and inanimate things – as 'nature', then this too has to be understood as an artefact of cultural construction. 'Nature is to culture', writes Marshall Sahlins, 'as the constituted is to the constituting' (1976: 209). Culture provides the building plan, nature is the building; but whence come the raw materials?

There must indeed be a physical world 'out there', beyond the multiple, intentional worlds of cultural subjects, otherwise there would be nothing to build with nor anyone, for that matter, to do the building. Minds cannot subsist without bodies to house them, and bodies cannot subsist unless continually engaged in material and energetic exchanges with components of the environment. Biological and ecological scientists routinely describe these exchanges as going on within a world of nature. It is apparently necessary, therefore, to distinguish between two kinds or versions of nature: 'really natural' nature (the object of study for natural scientists) and 'culturally perceived' nature (the object of study for social and cultural anthropologists). Such distinctions are indeed commonplace in anthropological literature: examples are Rappaport's between the 'operational' models of ecological science, purportedly describing nature as it really is, and the 'cognized' models of native people; and, perhaps most notoriously, the much used and abused distinction between 'etic' and 'emic' accounts (Rappaport 1968: 237–41, Ellen 1982, Chapter 9, cf. Ingold 1992a: 47–8).

In the formula 'nature is culturally constructed', nature thus appears on two sides: on one as the product of a constructional process, on the other as its precondition. Herein, however, lies a paradox. Many anthropologists are well aware that the basic contrast between physical substance and conceptual form, of which the dichotomy between nature and culture is one expression, is deeply embedded within the tradition of Western thought. It is recognized that the concept of nature, insofar as it denotes an external world of matter and substance 'waiting to be given meaningful shape and content by the mind of man' (Sahlins 1976: 210), is part of that very intentional world within which is situated the project of Western science as the 'objective' study of natural phenomena (Shweder 1990: 24). And yet the notion that there are intentional worlds, and that human realities are culturally constructed, rests on precisely the same ontological foundation. The paradox may be represented as follows:

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            ┌── Culture
  ┌─ Culture ─┤
  │          └── Nature (culturally perceived)
──┤
  └─ Nature (really natural)
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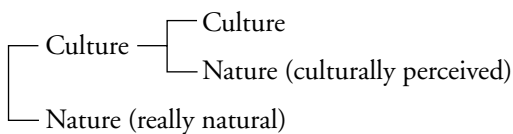
If the concept of nature is given within the intentional world of the Western scientist, then the concept of culture must – by the same token – be given within the intentional world of the Western humanist. Each, indeed, presupposes the other. Not only, then, must the concept of nature be regarded as a cultural construct, but so also must that of culture. As Carol MacCormack puts it: 'Neither the concept of nature nor that of culture is "given", and they cannot be free from the biases of the [European] culture in which the concepts were constructed' (1980: 6). The fact that 'culture' appears twice in this statement at once alerts us to a basic contradiction. For the references, in the second part of the statement, to culture and to the logic of construction take as 'given' the very concepts that, in the first part of the statement, are said to be historically relative.

Nor can the problem be contrived to disappear by trying to have it both ways, as Kirsten Hastrup does when she suggests that instead of regarding nature as 'either a relative cultural category or an objective physical framework around culture', it might better be seen as 'both-and' (1989: 7). For then culture, too, must be both-and, both an objective categorical constructor and a relative category constructed. To attempt to apply this logic is at once to be caught in the vortex of an infinite regress: if the opposed categories of 'nature' and 'culture' are themselves cultural constructs, then so must be the culture that constructs them, and the culture that constructs *that*, and so on *ad infinitum*. And since, at every stage in this regress, the reality of nature reappears as its representation, 'real' reality recedes as fast as it is approached.

In what follows I shall argue that hunter-gatherers do *not*, as a rule, approach their environment as an external world of nature that has to be 'grasped' conceptually and appropriated symbolically within the terms of an imposed cultural design, as a precondition for effective action. They do not see themselves as mindful subjects having to contend with an alien world of physical objects; indeed the separation of mind and nature has no place in their thought and practice. I should add that they are not peculiar in this regard: my purpose is certainly not to argue for some distinctive hunter-gatherer worldview or to suggest that they are somehow 'at one' with their environments in a way that other peoples are not. Nor am I concerned to set up a comparison between the 'intentional worlds' of hunter-gatherers and Western scientists or humanists. It is of course an illusion to suppose that such a comparison could be made on level terms, since the primacy of Western ontology, the 'givenness' of nature and culture, is implicit in the very premises on which the comparative project is itself established (see Figure 3.1).

What I wish to suggest is that we reverse this order of primacy, and follow the lead of hunter-gatherers in taking the human condition to be that of a being immersed from the start, like other creatures, in an active, practical and perceptual engagement with constituents of the dwelt-in world. This ontology of dwelling, I contend, provides us with a better way of coming to grips with the nature of human existence than does the alternative, Western ontology whose point of departure is that of a mind detached from the world, and that has literally to formulate it – to build an intentional world in consciousness – prior to any attempt at engagement. The contrast, I repeat, is not between alternative views of the world; it is rather between two ways of apprehending it, only one of which (the Western) may be characterised as the construction of a view, that is, as a process of mental representation. As for the other, apprehending the world is not a matter of construction but of engagement, not of building but of dwelling, not of making a view *of* the world but of taking up a view *in* it (Ingold 1996a: 117).

Figure 3.1   A comparison between 'non-Western' and 'Western' intentional worlds assumes the primacy of the Western ontology, with its dichotomy between nature and culture, or between physical substance and conceptual form.

In the following three sections I shall move on to examine, in more detail, how this

contrast has been played out in the context of Western anthropological studies of hunters and gatherers. First, I shall consider how certain tropical hunter-gatherer peoples perceive their relations to their forest environment. Secondly, I shall look at the way northern hunters, in particular the Cree of northeastern Canada, understand their relations to the animals they hunt. Thirdly, drawing on ethnographic material from Aboriginal Australia and subarctic Alaska, I shall consider the way hunters and gatherers perceive the landscape. I conclude by showing how anthropological attempts to depict the mode of practical engagement of hunter-gatherers with the world as a mode of cultural construction of it have had the effect, quite contrary to stated intentions, of perpetuating a naturalistic vision of the hunter-gatherer economy.

CHILDREN OF THE FOREST

In his classic study of the Mbuti Pygmies of the Ituri Forest, Colin Turnbull observes that the people recognise their dependence on the forest that surrounds them by referring to it as 'Father' or 'Mother'. They do so 'because, as they say, it gives them food, warmth, shelter and clothing, just like their parents', and moreover, 'like their parents, [it] gives them affection' (Turnbull 1965: 19). This form of reference, and the analogy it establishes between the most intimate relations of human kinship and the equally intimate relations between human persons and the non-human environment, is by no means unique to the Mbuti.[1] Precisely similar observations have been made among other hunter-gatherers of the tropical forest, in widely separate regions of the world. For example, among the Batek Negritos of Malaysia, according to Kirk Endicott, the forest environment 'is not just the physical setting in which they live, but a world made for them in which they have a well-defined part to play. They see themselves as involved in an intimate relationship of interdependence with the plants, animals and *hala'* (including the deities) that inhabit their world' (Endicott 1979: 82). The *hala'* are the creator beings who brought the forest world into existence for the people, who protect and care for it, and provide its human dwellers with nourishment. And again, among the Nayaka, forest-dwelling hunter-gatherers of Tamil Nadu, South India, Nurit Bird-David found a similar attitude: 'Nayaka look on the forest as they do on a mother or father. For them, it is not something "out there" that responds mechanically or passively but like a parent, it provides food unconditionally to its children' (Bird-David 1990: 190). Nayaka refer to both the spirits that inhabit the landscape and the spirits of their own predecessors by terms that translate as 'big father' and 'big mother', and to themselves in relation to these spirits as sons and daughters.

What are we to make of this? Drawing an explicit parallel between her own Nayaka material and the ethnography of the Batek and Mbuti, Bird-David argues that hunter-gatherer perceptions of the environment are typically oriented by the primary metaphor 'forest is as parent', or more generally by the notion that the environment *gives* the wherewithal of life to people – not in return for appropriate conduct, but unconditionally. Among neighbouring populations of cultivators, by contrast, the environment is likened to an ancestor rather than a parent, which yields its bounty only reciprocally, *in return* for favours rendered. It is this difference in orientation to the environment, she suggests, that most fundamentally distinguishes hunter-gatherers from cultivators, and it is upheld even when the former draw (as they often do) on cultivated resources and when the latter, conversely, draw on the 'wild' resources of the forest (Bird-David 1990). In a subsequent extension of the argument, and drawing once again on Mbuti, Batek and Nayaka

ethnography, Bird-David (1992a) proposes that hunter-gatherers liken the unconditional way in which the forest transacts with people to the similarly unconditional transactions that take place among the people of a community, which in anthropological accounts come under the rubric of sharing. Thus the environment shares its bounty with humans just as humans share with one another, thereby integrating both human and non-human components of the world into one, all-embracing 'cosmic economy of sharing'.

But when the hunter-gatherer addresses the forest as his or her parent, or speaks of accepting what it has to offer as one would from other people, on what grounds can we claim that the usage is metaphorical? This is evidently not an interpretation that the people would make themselves; nevertheless – taking her cue from Lakoff and Johnson (1980) – Bird-David argues that these key metaphors enable them to make sense of their environment, and guide their actions within it, even though '*people may not be normally aware of them*' (1992a: 31; 1990: 190, my emphasis). There is a troublesome inconsistency here. On the one hand, Bird-David is anxious to offer a culture-sensitive account of the hunter-gatherer economy, as a counterpoint to the prevailing ecologism of most anthropological work in this field. On the other hand, she can do so only by imposing a division of her own, which forms no part of local conceptions, between actuality and metaphor. Underwriting this division is an assumed separation between two domains: the domain of human persons and social relations, wherein parenting and sharing are matters of everyday, commonsense reality; and the domain of the non-human environment, the forest with its plants and animals, relations with which are understood by drawing, for analogy, on those intrinsic to the first domain. In short, hunter-gatherers are supposed to call upon their experience of relations in the human world in order to model their relations with the non-human one.

The theoretical inspiration for this analytical tactic comes from Stephen Gudeman (1986), so let us turn to look at how he approaches the matter. Starting from the assumption that 'humans are modelers', Gudeman proposes that 'securing a livelihood, meaning the domain of material "production", "distribution" and "consumption", is culturally modeled in all societies' (1986: 37). Entailed in the notion of modeling is a distinction between a 'schema' which provides a programme, plan or script, and an 'object' to which it is applied: thus 'the model is a projection from the domain of the schema to the domain of the object' (p. 38). Comparing Western and non-Western (or 'local') models of livelihood, Gudeman suggests that in the former, schemas taken from the 'domain of material objects' are typically applied to 'the domain of human life', whereas in the latter the direction of application is reversed, such that 'material processes are modeled as being intentional' (pp. 43–4). But notice how the entire argument is predicated upon an initial ontological dualism between the intentional worlds of human subjects and the object world of material things, or in brief, between society and nature. It is only by virtue of holding these to be separate that the one can be said to furnish the model for the other. The implication, however, is that the claim of the people themselves to inhabit but one world, encompassing relations with both human and non-human components of the environment on a similar footing, is founded upon an illusion – one that stems from their inability to recognise where the reality ends and its schematic representation begins. It is left to the anthropological observer to draw the dividing line, on one side of which lies the social world of human modelers of nature, and on the other, the natural world modeled as human society.

In the specific case with which we are concerned, hunter-gatherers' material interactions with the forest environment are said to be modeled on the interpersonal relations of

parenting and sharing: the former, assigned to the domain of nature, establish the object; the latter, assigned to the domain of society, provide the schema. But this means that actions and events that are constitutive of the social domain must be representative of the natural. When, for example, the child begs its mother for a morsel of food, that communicative gesture is itself a constitutive moment in the development of the mother–child relationship, and the same is true for the action of the mother in fulfilling the request. Parenting is not a construction that is projected *onto* acts of this kind, it rather subsists *in* them, in the nurture and affection bestowed by adults on their offspring. Likewise, the give and take of food beyond the narrow context of parent–child ties is constitutive of relations of sharing, relations that subsist in the mutuality and companionship of persons in intimate social groups (cf. Price 1975, Ingold 1986a: 116–17). Yet according to the logic of the argument outlined above, as soon as we turn to consider exchange with the non-human environment, the situation is quite otherwise. For far from subsisting in people's practical involvement with the forest and its fauna and flora in their activities of food-getting, parenting and sharing belong instead to a construction that is projected onto that involvement from a separate, social source. Hence, when the hunter-gatherer begs the forest to provide food, as one would a human parent, the gesture is not a moment in the unfolding of relations between humans and non-human agencies and entities in the environment, it is rather an act that says something about these relationships, a representative evaluation or commentary.[2]

In short, actions that in the sphere of human relations would be regarded as instances of practical involvement with the world come to be seen, in the sphere of relations with the non-human environment, as instances of its metaphorical construction. Yet those who would construct the world, who would be 'modelers' in Gudeman's sense, must already live in it, and life presupposes an engagement with components not only of the human but also of the non-human environment. People need the support and affection of one another, but they also need to eat. How then, to stay with the same argument, do hunter-gatherers deal, actually rather than metaphorically, with non-human beings in the practical business of gaining a livelihood? They cannot do so in their capacity as persons, since non-human agencies and entities are supposed to have no business in the world of persons save as figures of the anthropomorphic imagination. Hence the domain of their actual interaction with the non-human environment in the procurement of subsistence must lie beyond that of their existence as persons, in a separate domain wherein they figure as biological objects rather than cultural subjects, that is as organisms rather than persons. This is the *natural* domain of organism-environment interactions, as distinct from the *social* domain of interpersonal relations. In Figure 3.2 (upper diagram) this result is indicated schematically.

There is a profound irony here. Was not the principal objective to counteract that 'naturalisation of the hunter-gatherer economy' which, as Sahlins comments (1976: 100), has formed the received anthropological wisdom, in favour of an account sensitive to the nuances of local culture? Yet what we find is that such naturalisation is entailed in the very stance that treats the perception of the environment as a matter of reconstructing the data of experience within intentional worlds. The sphere of human engagement with the environment, in the practical activities of hunting and gathering, is disembedded from the sphere within which humans are constituted as social beings or persons, as a precondition for letting the latter stand to the former as schema to object. The consequences are all too apparent from the conclusion towards which Gudeman moves, in bringing his argument to a close:
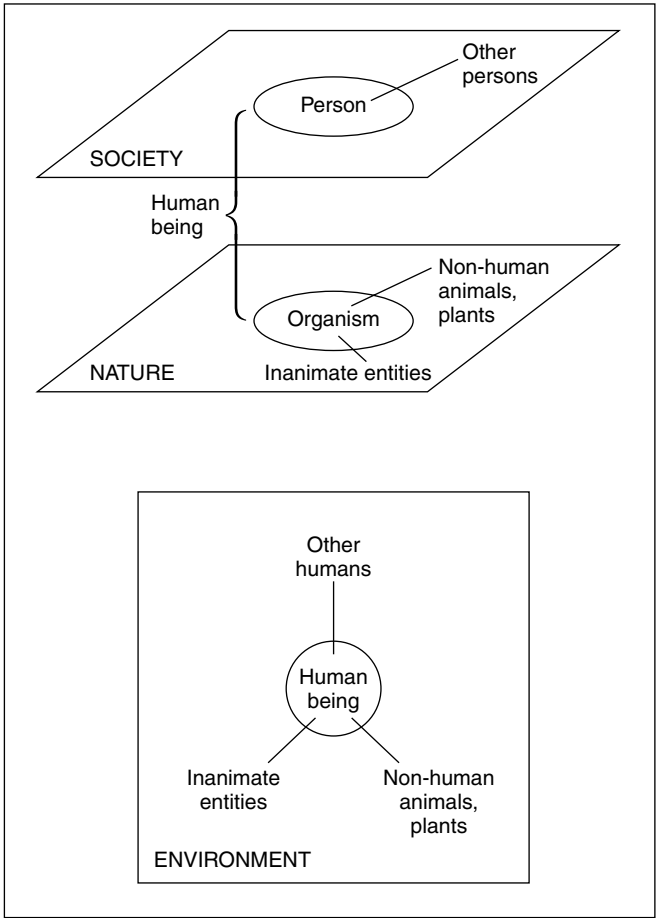
Figure 3.2 Western anthropological (above) and hunter-gatherer (below) economies of knowledge.

> In all living societies humans must maintain themselves by securing energy from the environment. Although this life-sustaining process amounts only to a rearranging of nature, a transforming of materials from one state or appearance to another, humans make something of this activity.
>
> (1986: 154)

By his own account, then, the life-process of human beings, shorn of the diverse constructions that are placed upon it, and that 'make something' of it, is nothing more than *a rearranging of nature*.

In this connection, we may recall Sahlins's attempt to treat 'economy' as a 'component of culture', which led him to contrast 'the material life process of society' to 'a need satisfying process of individual behaviour' (1972: 186 fn.1). Hunting and gathering, by this account, are operations that take place in nature, consisting of interactions between human organisms with 'needs', and environmental resources with the potential to satisfy them. Only after having been extracted is the food transferred to the domain of society, wherein

its distribution is governed by a schema for sharing, a schema inscribed in the social relations which the economic practices of sharing serve to reproduce (see Ingold 1988a: 275). In the economy of knowledge, as conceived in general by Gudeman and specifically for hunter-gatherers by Bird-David, what applies to food applies also to sensory experience. That experience, gained through human organism–environment interactions, provides the raw material of sensation that – along with food – hunters and gatherers 'take home' with them. Carried over to the domain of interpersonal relations, it too is assimilated to a social schema, to yield a cultural construction of nature such as 'the forest is as parent'.

In Figure 3.2 this anthropological conception of the economy of knowledge is contrasted with that of the people themselves. In their account (lower diagram) there are not two worlds, of nature and society, but just one, saturated with personal powers, and embracing both humans, the animals and plants on which they depend, and the features of the landscape in which they live and move. Within this one world, humans figure not as composites of body and mind but as undivided beings, 'organism-persons', relating as such both to other humans and to non-human agencies and entities in their environment. Between these spheres of involvement there is no *absolute* separation, they are but contextually delimited segments of a single field. As Bird-David observes, hunter-gatherers 'do not inscribe into the nature of things a division between the natural agencies and themselves, as we [Westerners] do with our "nature:culture" dichotomy. They view their world as an integrated entity' (1992a: 29–30). And so one gets to know the forest, and the plants and animals that dwell therein, in just the same way that one becomes familiar with other people, by spending time with them, investing in one's relations with them the same qualities of care, feeling and attention. This explains why hunters and gatherers consider time devoted to forays in the forest to be well spent, even if it yields little or nothing by way of useful return: there is, as Bird-David puts it, 'a concern with the activity itself' (1992a: 30), since it allows people to 'keep in touch' with the non-human environment. And because of this, people know the environment 'intimately, in the way one "knows" close relatives with whom one shares intimate day-to-day life' (Bird-David 1992b: 39).

That the perception of the social world is grounded in the direct, mutually attentive involvement of self and other in shared contexts of experience, prior to its representation in terms of received conceptual schemata, is now well established. But in Western anthropological and psychological discourse such involvement continues to be apprehended within the terms of the orthodox dualisms of subject and object, persons and things. Rendered as 'intersubjectivity', it is taken to be the constitutive quality of the social domain *as against* the object world of nature, a domain open to human beings but not to non-human kinds (Willis 1990: 11–12). Thus according to Trevarthen and Logotheti, 'human cultural intelligence is seen to be founded on a level of engagement of minds, or intersubjectivity, such as no other species has or can acquire' (1989: 167). In the hunter-gatherer economy of knowledge, by contrast, it is as entire persons, not as disembodied minds, that human beings engage with one another and, moreover, with non-human beings as well. They do so as beings *in* a world, not as minds which, excluded from a given reality, find themselves in the common predicament of having to make sense of it. To coin a term, the constitutive quality of their world is not intersubjectivity but *inter-agentivity*. To speak of the forest as a parent is not, then, to model object relations in terms of primary intersubjectivity, but to recognize that at root, the constitutive quality of intimate relations with non-human and human components of the environment is one and the same.

HUMANS AND ANIMALS

The Waswanipi Cree of northeastern Canada, according to Harvey Feit, 'say that they only catch an animal when the animal is given to them. They say that in winter the north wind, *chuetenshu*, and the animals themselves give them what they need to live' (Feit 1973: 116). This idea, that the nourishing substance of animals is received by humans as a gift, is widely reported among northern hunting peoples, but in what follows I shall confine my remarks to studies of two other Cree groups. Among the Wemindji Cree, 'respectful activity towards the animals enhances the readiness with which they give themselves, or are given by God, to hunters' (Scott 1989: 204). And for the Mistassini Cree, Adrian Tanner reports that the events and activities of the hunt, though they have an obvious 'commonsense' significance insofar as they entail the deployment of technical knowledge and skill in the service of providing for the material needs of the human population, are also 'reinterpreted' on another, magico-religious level:

> The facts about particular animals are reinterpreted as if they had social relationships between themselves, and between them and anthropomorphized natural forces, and furthermore the animals are thought of as if they had personal relations with the hunters. The idealized form of these latter relations is often that the hunter pays respect to an animal; that is, he acknowledges the animal's superior position, and following this the animal 'gives itself' to the hunter, that is, allows itself to assume a position of equality, or even inferiority, with respect to the hunter.
>
> (Tanner 1979: 136)

In short, the animals figure for these northern hunters very much as the forest figures for such tropical hunter-gatherers as the Mbuti, Batek and Nayaka: they are partners with humans in an encompassing 'cosmic economy of sharing'.

Now Western thought, as is well known, drives an absolute division between the contrary conditions of humanity and animality, a division that is aligned with a series of others such as between subjects and objects, persons and things, morality and physicality, reason and instinct, and, above all, society and nature. Underwriting the Western view of the uniqueness of the human species is the fundamental axiom that *personhood as a state of being is not open to non-human animal kinds*. It is for this reason that we are able to conflate both the moral condition and the biological taxon (*Homo sapiens*) under the single rubric of 'humanity'. And for this reason, too, we can countenance an enquiry into the animal nature of human beings whilst rejecting out of hand the possibility of an enquiry into the humanity of non-human animals (Ingold 1988b: 6). Human existence is conceived to be conducted simultaneously on two levels, the social level of interpersonal, intersubjective relations and the natural ecological level of organism–environment interactions, whereas animal existence is wholly confined within the natural domain. Humans are both persons *and* organisms, animals are all organism.

This is a view, however, that Cree and other northern hunters categorically reject. Personhood, for them, *is* open equally to human and non-human animal (and even non-animal) kinds. Here, once again, is Feit on the Waswanipi:

> In the culturally constructed world of the Waswanipi the animals, the winds and many other phenomena are thought of as being 'like persons' in that they act intelligently and have wills and idiosyncracies, and understand and are understood by men. Causality,

therefore, is personal not mechanical or biological, and it is . . . always appropriate to ask 'who did it?' and 'why?' rather than 'how does that work?'

<div align="right">(1973: 116)</div>

This rendering of the Cree perspective is echoed by Tanner, who points to the significant implication of the idea that game animals live in social groups or communities akin to those of human beings, namely 'that social interaction between humans and animals is made possible' (1979: 137–8). Hunting itself comes to be regarded not as a technical manipulation of the natural world but as a kind of interpersonal dialogue, integral to the total process of social life wherein both human and animal persons are constituted with their particular identities and purposes. Among the Wemindji Cree, qualities of personhood are likewise assigned to humans, animals, spirits and certain geophysical agents. As Colin Scott writes: 'human persons are not set over and against a material context of inert nature, but rather are one species of person in a network of reciprocating persons' (1989: 195).

Though the ethnographic accounts offered by Tanner and Scott are in striking agreement, their interpretations are not, and it is revealing to explore the contrast between them. The problem hinges on the question of whether, when the Cree hunter refers to animals or to the wind as he would to human persons, he does so within the compass of what Feit, in the passage cited above, calls a 'culturally constructed world'. Tanner is in no doubt that they do. Thus he asserts that 'game animals participate simultaneously in two levels of reality, one "natural" and the other "cultural"' (1979: 137). On the natural level they are encountered simply as material entities, organic constituents of the object world to be killed and consumed. On the cultural level, by contrast, they are 'reinterpreted' as anthropomorphic beings participating in a domain 'modelled on conventional Cree patterns of social and cultural organization' (*ibid.*). In terms of this analysis, then, animals are constructed as persons through their assimilation to a schema drawn from the domain of human relations. This is entirely in accord with Gudeman's theory of the cultural modeling of livelihood, which I discussed in the previous section. Indeed, Gudeman draws for ethnographic support, *inter alia*, on Tanner's study. 'The Mistassini Cree', he writes, 'construct their hunting and trapping activities as an exchange between themselves and animal spirits . . . and the exchange itself is patterned after ordinary human relationships, such as friendship, coercion and love' (Gudeman 1986: 148–9, citing Tanner 1979: 138, 148–50).

I have already shown, in the case of hunter-gatherer relations with the forest environment, how the constructionist argument is founded on an ontological dualism between society and nature, which in this instance reappears as one between humanity and animality. On one side, then, we have the world of human modelers of animals, on the other the animal world modeled as human. If the people themselves profess to be aware of but one world, of persons and their relationships, it is because, seeing their own social ambience reflected in the mirror of nature, they cannot distinguish the reflection from reality. Now by all accounts, as we have seen, the dualism of humanity and animality, and the entailed restriction of personhood to human beings, is not endorsed by the Cree. This does not mean, of course, that they fail to differentiate between humans and animals. To the contrary, they are acutely concerned about such differences. For example, while humans may have sexual relations with certain other humans, and may kill and consume certain non-human animals, the consequences of categorical confusion – of sex with non-humans or killing fellow human beings – would be disastrous (Scott 1989: 197).

The point is that the difference between (say) a goose and a man is not between an organism and a person, but between one kind of organism-person and another. From the Cree perspective, personhood is not the manifest form of humanity; rather the human is one of many outward forms of personhood. And so when Cree hunters claim that a goose is in some sense like a man, far from drawing a figurative parallel across two fundamentally separate domains, they are rather pointing to the real unity that underwrites their differentiation. Whereas Western thought sets out from an assumed dichotomy between the human and the animal and then searches about for possible analogies or homologies, the Cree trajectory – as Scott explains – 'seems rather the opposite: to assume fundamental similarity while exploring the differences between humans and animals' (1989: 195). To posit a 'metaphorical' equivalence between goose and man is not, then, to render 'one kind of thing in terms of another' (Lakoff and Johnson 1980: 5), as Western – including Western anthropological – convention would have it. A more promising perspective is offered by Michael Jackson, who argues that metaphor should be apprehended as a way of drawing attention to real relational unities rather than of figuratively papering over dualities. Metaphor, Jackson writes, 'reveals, not the "thisness of a that" but rather that "this *is* that"' (1983: 132).[3]

It follows that the equivalence can work both ways. It is not 'anthropomorphic', as Tanner suggests (1979: 136), to compare the animal to the human, any more than it is 'naturalistic' to compare the human to the animal, since in both cases the comparison points to a level on which human and animal share a common existential status, namely as living beings or persons. The move, if you will, is not from the literal to the figurative, but from the actual to the potential – for personhood, at root, is the potential to become a man, a goose, or any other of the innumerable forms of animate being. From this perspective, it makes no significant difference whether one renders animal actions in human terms or human actions in animal terms. As Scott puts it:

> One might observe that a consequence of the sort of analogical thinking that I have been describing would be to anthropomorphize animals, but that would be to assume the primacy of the human term. The animal term reacts with perhaps equal force on the human term, so that animal behaviour can become a model for human relations.
>
> (1989: 198)

This same argument can be applied, *pari passu*, to the metaphor 'forest is as parent', considered in the last section. One could just as well say that 'parent is as forest', for the force of the metaphor is to reveal the underlying ontological equivalence of human and non-human components of the environment as agencies of nurturance.

What humans and non-humans have in common, for Cree as for other hunter-gatherers, is that they are *alive*. Ostensibly, and barring certain geophysical phenomena that Cree would regard as animate but that we might not, this is a conclusion with which Western thinkers would not disagree. Yet in Western biology, as we saw in Chapter One (p. 19), life tends to be understood as a passive process, as the reaction of organisms, bound by their separate natures, to the given conditions of their respective environments. This carries the implication that every organism is pre-specified, with regard to its essential nature, *prior* to its entry into the life process – an implication that in modern biology appears in the guise of the doctrine of genetic preformation. With this view, personal powers – of awareness, agency and intentionality – can form no part of the organism *as such*, but must necessarily be 'added on' as capacities not of body but of mind, capacities that Western

thought has traditionally reserved for humans. Even today, now that the possibility of non-human animal awareness has arisen as a legitimate topic of scientific speculation, the basic dualism of mind and body is retained – for the question is phrased as one about the existence of animal *minds* (Griffin 1976, 1984, see Ingold 1988c). Consciousness, then, is the life of the mind.

For the Cree, life has a different meaning. Scott tells us that 'the term *pimaatisiiwin*, "life", was translated by one Cree man as "continuous birth"' (1989: 195). To be alive is to be situated within a field of relations which, as it unfolds, actively and ceaselessly brings forms into being: humans as humans, geese as geese, and so on. Far from revealing forms that are already specified, life is the process of their ongoing generation. Every living being, then, emerges as a particular, positioned embodiment of this generative potential. Hence personhood, far from being 'added on' to the living organism, is implicated in the very condition of being alive: the Cree word for 'persons', according to Scott, 'can itself be glossed as "he lives"' (1989: 195). Organisms are not just *like* persons, they *are* persons. Likewise, consciousness is not supplementary to organic life but is, so to speak, its advancing front – 'on the verge of unfolding events, of continuous birth', as Scott (*ibid.*) renders the Cree conception.

Now the ontological equivalence of humans and animals, as organism-persons and as fellow participants in a life process, carries a corollary of capital importance. It is that both can have points of view. In other words, for both the world exists as a meaningful place, constituted in relation to the purposes and capabilities of action of the being in question. Western ontology, as we have seen, denies this, asserting that meaning does not lie in the relational contexts of the perceiver's involvement in the world, but is rather laid over the world by the mind. Humans alone, it is said, are capable of representing an external reality in this way, organising the data of experience according to their diverse cultural schemata. So when the Cree claim, as indeed they do, that the same events surrounding a hunt afford two possible interpretations, from the points of view, respectively, of the human hunter and of the animal hunted, the Western observer is inclined to regard the former as literal and the latter as figurative, 'as if' the animal were human and so could participate with 'real' humans in a common world of meanings. And this is precisely what Tanner does (1979: 136–7) when he re-presents to us – his readers – as a 'cultural' reality (as opposed to a 'natural' one) what the Cree originally presented to him as a 'bear reality' or 'caribou reality' (as opposed to a 'human' one). Note that the distinction between natural and cultural levels of participation is not one that the Cree make themselves. According to Scott, Cree has 'no word corresponding to our term "nature"', nor does it have any 'equivalent of "culture" that would make it a special province of humans' (1989: 195).

A creature can have a point of view because its action in the world is, at the same time, a process of *attending* to it. Different creatures have different points of view because, given their capabilities of action and perception, they attend to the world in different ways. Cree hunters, for example, notice things about the environment that geese do not, yet by the hunters' own admission (Scott 1989: 202), geese also notice things that humans do not. What is certain, however, is that humans figure in the perceptual world of geese just as geese figure in that of humans. It is clearly of vital importance to geese that they should be as attentive to the human presence as to the presence of any other potential predator. On the basis of past experience, they learn to pick up the relevant warning signs, and continually adjust their behaviour accordingly. And human hunters, for their part, attend to the presence of geese *in the knowledge that geese are attending to them*. 'The perceptions

and interpretations of Cree hunters', Scott observes, 'suggest that geese are quite apt at learning in what contexts to expect predation, at learning to distinguish predatory from non-predatory humans, and at communicating appropriate behavioural adaptations to other geese' (1989: 199).

In short, animals do not participate with humans *qua* persons only in a domain of virtual reality, as represented within culturally constructed, intentional worlds, superimposed upon the naturally given substratum of organism–environment interactions. They participate as real-world creatures, endowed with powers of feeling and autonomous action, whose characteristic behaviours, temperaments and sensibilities one gets to know in the very course of one's everyday practical dealings with them. In this regard, dealing with non-human animals is not fundamentally different from dealing with fellow humans. Indeed the following definition of sociality, originally proposed by Alfred Schutz, could – with the insertions indicated in brackets – apply with equal force to the encounter between human hunters and their prey: 'Sociality is constituted by communicative acts in which the I [the hunter] turns to the others [animals], apprehending them as persons who turn to him, and both know of this fact' (Schutz 1970: 163). Humans may of course be unique in their capacity to *narrate* such encounters, but no-one can construct a narrative, any more than they could build a model, who is not already situated in the world and thus already caught up in a nexus of relations with both human and non-human constituents of the environment. The relations that Cree have with the latter are what we, outside observers, call hunting.

PERCEIVING THE LANDSCAPE

Life, of course, is an historical process, embodied in organic forms that are fragile and impermanent. Yet this process is carried on, for terrestrial species, upon the surface of the earth, a surface whose contours, textures and features, sculpted by geological forces over immense periods of time, appear permanent and immutable relative to the life-cycles of even the most long-lived of organisms (Ingold 1989: 504). This surface is what geology textbooks call the 'physical landscape'. How do hunters and gatherers perceive this aspect of their environment?

Among the Pintupi of the Gibson Desert of Western Australia, people say that the landscape was formed, once and for all time, through the activities of theriomorphic beings, ancestral to humans as well as to all other living things, who roamed the earth's surface in an era known conventionally as the Dreaming. The same idea is, in fact, current throughout Aboriginal Australia, but in what follows I shall confine my illustrative remarks to the Pintupi. According to Fred Myers, Pintupi say that, as ancestral beings travelled from place to place,

> [they] hunted, performed ceremonies, fought, and finally turned to stone or 'went into the ground', where they remain. The actions of these powerful beings – animal, human and monster – created the world as it now exists. They gave it outward form, identity (a name), and internal structure. The desert is crisscrossed with their lines of travel and, just as an animal's tracks leave a record of what has happened, the geography and special features of the land – hills, creeks, salt lakes, trees – are marks of the ancestors' activities.
>
> (1986: 49–50)

Such features are more than mere marks, however, for in their activities the ancestors did not leave a trail of impressions behind them, like footprints in the sand, while they themselves moved on. They rather metamorphosed *into* the forms of the landscape as they went along. Ever present in these forms, their movements are congealed in perpetuity.

On the land travelled by the ancestors in the Dreaming, people make their way in the temporal domain of ordinary life, pursuing their own everyday activities. Though the paths they take are not constrained to the lines of ancestral travel, in following tracks (as in hunting) and in making tracks themselves they replicate the original, creative movement of the ancestral beings, inscribing their own identities into the land as they go. As Roy Wagner has put it, with reference to the neighbouring Walbiri people, 'the life of a person is the sum of his tracks, the total inscription of his movements, something that can be traced out along the ground' (Wagner 1986: 21, see also Chapter Eight, pp. 144–6). And for the Pintupi, Myers writes that 'for each individual, the landscape becomes a history of significant social events . . . previous events become attached to places and are recited as one moves across the country' (Myers 1986: 68). There is thus a second level in the constitution of the landscape, one tied to the historical actions of ordinary human beings, as opposed to the 'transhistorical' actions of the ancestors (1986: 55). On the first level, named places were created by the ancestral beings at the sites of their activities, or at points where they entered or emerged from the ground, and, connected by the paths of ancestral travel, these places make up what Myers calls a 'country' – a term he offers as one possible rendering of the Pintupi word *ngurra*. But *ngurra* can also mean 'camp' – that is, the place temporarily constituted by virtue of the everyday activities of a group of people who happen to set up there. Such places, unlike the named places envisioned as the camps of the ancestors in the Dreaming, do not endure for ever. Each is identified with the particular people who live there, and will be avoided for many years after someone thus connected to the place has died. But 'despite these identifications, . . . camps are impermanent. Eventually they are overgrown and their associations forgotten, while significant new spaces are constantly being established' (Myers 1986: 56–7).

If persons inscribe their identities into the landscape as historically constituted, it is from the transhistorical level of the Dreaming that these identities are initially derived. Thus each person takes his or her primary identity from a particular named place, and is regarded as the incarnation of the ancestor whose activity made that place. That is why, as Myers notes (1986: 50), 'it is not unusual . . . to hear people describe actions of the Dreaming in the first person'. For in speaking about my ancestor, I am speaking about myself. Throughout life, additional components of identity accrue through association with other named places, such as where one was initiated or where one has long resided, so that who one is becomes a kind of record of where one has come from and where one has been. It follows that the network of places, linked by paths of ancestral travel, is at the same time a network of relations between persons. When social relations are spoken of, as they often are, in terms of relations between places, the comparison does not draw a parallel across separate domains of society and the physical world, but rather reveals that – at a more fundamental ontological level – these relations are equivalent. That level is the Dreaming. It is a level, however, that is not directly given to experience, but rather revealed in the actions and events of the phenomenal world that are its visible signs (Myers 1986: 49).

We might sum up this Pintupi understanding of the landscape in the following four precepts. First, it is not a given substrate, awaiting the imprint of activities that may be conducted upon it, but is itself the congelation of past activity – on the phenomenal level,

of human predecessors, but more fundamentally of ancestral beings. Secondly, it is not so much a continuous surface as a topologically ordered network of places, each marked by some physical feature, and the paths connecting them. Thirdly, the landscape furnishes its human inhabitants with all the lineaments of personal and social identity, providing each with a specific point of origin and a specific destiny. And therefore, fourthly, the movement of social life is itself a movement *in* (not *on*) a landscape, and its fixed reference points are physically marked localities or 'sites'. In short, the landscape is not an external background or platform for life, either as lived by the ancestors in the Dreaming or as relived by their ordinary human incarnations in the temporal domain. It is rather life's enduring monument.

What can we learn from the Pintupi? It could be argued, of course, that their ideas of the Dreaming – though not unique to themselves – are specifically Aboriginal ones, and afford no grounds for generalisation beyond the Australian continent. Indeed, comparisons between Australia and other continents of hunter-gatherers are fraught with difficulty. Nevertheless, in order to indicate that there are genuine similarities in the ways that hunters and gatherers apprehend the landscape and their own position in it, I should like to refer briefly to another study from a quite different region of the world – Richard Nelson's 1983 study of the Koyukon of Alaska.

The Koyukon say that the earth and all the beings that flourish in it were created in an era known as the 'Distant Time'. Stories of the Distant Time include accounts of the formation of prominent features of the landscape such as hills and mountains (1983: 16, 34). An elaborate code of rules, brought down from the Distant Time, establishes forms of proper conduct that people are bound to follow; thus 'the Koyukon must move *with* the forces of their surroundings, not attempting to control, master or fundamentally alter them' (p. 240). As people move around in the landscape, in hunting and trapping, in setting up camp in one locality after another, their own life histories are woven into the country:

> The Koyukon homeland is filled with places . . . invested with significance in personal or family history. Drawing back to view the landscape as a whole, we can see it completely interwoven with these meanings. Each living individual is bound into this pattern of land and people that extends throughout the terrain and far back across time.
> (Nelson 1983: 243)

Places, however, can possess meaning at different levels. Some have a fundamental spiritual potency connected with the Distant Time story of their creation. Some, where people have died, are avoided for as long as the memory persists. Others, again, are known for particular hunting events or other personal experiences of encounters with animals. On all these levels – spiritual, historical, personal – the landscape is inscribed with the lives of all who have dwelt therein, from Distant Time human-animal ancestors to contemporary humans, and the landscape itself, rather than anything erected upon it, stands in memory of these persons and their activities (Nelson 1983: 242–6).

Now let me turn to the anthropological interpretation of these ways of apprehending the landscape. Astonishingly, we find a complete inversion, such that meanings that the people claim to discover *in* the landscape are attributed to the minds of the people themselves, and are said to be mapped *onto* the landscape. And the latter, drained of all significance as a prelude to its cultural construction, is reduced to *space*, a vacuum to the plenum of culture. Thus Myers can write, of the Pintupi, that they have 'truly culturalized space and made out of impersonal geography a home, a *ngurra*' (1986: 54). A moment

later, however, the Pintupi achievement reappears as an artefact of anthropological analysis: 'we will consider country *as if it were* simply culturalized space' (p. 57, my emphases). The ontological foundation for this interpretative strategy is an initial separation between human persons, as meaning-makers, and the physical environment as raw material for construction; the 'culturalisation of space' is then what happens when the two are brought into juxtaposition, such that social relations are mapped onto spatial relations. The Pintupi are said to superimpose the Dreaming, a 'distinctly Aboriginal cultural construction' (p. 47), onto the 'real' reality of the physical landscape, causing the latter to recede from view, cloaked by the 'perceived' reality enshrined in the stories people tell, of ancestral beings and their activities. This, of course, flatly contradicts Pintupi ontology, which is premised on the fundamental *indissolubility* of the connection between persons and landscape, and on the assumption that phenomenal reality is open to direct perception whereas the order of the Dreaming is not, and can be apprehended only by way of its visible signs.[4]

The same contradiction is apparent in Nelson's account of the Koyukon. His experience of the discrepancy between the Koyukon attitude to the environment and that derived from his own 'Euro-American' background led him, he tells us, to endorse the perspective of cultural relativism, whose basic premise he sets out as follows:

> Reality is not the world as it is perceived directly by the senses; reality is the world as it is perceived by the *mind* through the medium of the senses. Thus reality in nature is not just what we see, but what we have *learned* to see.
>
> (1983: 239)

That we learn to see is not in doubt, but learning in this view entails the acquisition of cultural schemata for building representations of the world, in the mind, from data delivered by the senses. So the Koyukon, viewing the world in their mind's eye through the lens of received tradition, are supposed to see one reality; the Westerner, viewing it in terms of the concepts of scientific ecology, sees another. There is, Nelson concludes, no 'single reality in the natural world, . . . absolute and universal'. Yet not only is the existence of such a 'real' reality implied in the very notion that perceived realities are representations, in the mind, of a naturally given world 'out there', but this mentalist ontology also flies in the face of what the Koyukon themselves, by Nelson's own account, are trying to tell us.

This is all about watching and being watched (1983: 14–32). Knowledge of the world is gained by moving about in it, exploring it, attending to it, ever alert to the signs by which it is revealed. Learning to see, then, is a matter not of acquiring schemata for mentally *constructing* the environment but of acquiring the skills for direct perceptual *engagement* with its constituents, human and non-human, animate and inanimate. To recall a distinction I introduced in the last chapter, it is a process not of enculturation but of enskilment. If the Koyukon hunter notices significant features of the landscape of which the Western observer remains unaware, it is not because their source lies in 'the Koyukon mind' (Nelson 1983: 242) which imposes its own unique construction on a common body of sensory data, but because the perceptual system of the hunter is attuned to picking up information, critical to the practical conduct of his hunting, to which the unskilled observer simply fails to attend. That information is not in the mind but in the world, and its significance lies in the relational context of the hunter's engagement with the constituents of that world. Moreover, the more skilled the hunter, the more

knowledgeable he becomes, for with a finely honed perceptual system, the world will appear to him in greater richness and profundity. New knowledge comes from creative acts of discovery rather than imagining, from attending more closely to the environment rather than reassembling one's picture of it along new conceptual lines.

It will at once be objected that I have taken no account of that vital component of knowledge that comes to people through their instruction in traditional lore, for example in the stories of the Dreaming among the Pintupi and of the Distant Time among the Koyukon. Do not these stories, along with the accompanying songs, designs, sacred objects and the like, amount to a kind of modelling of reality, a representation of the world that native people might consult as Westerners would consult a map? I think not. People, once familiar with a country, have no need of maps, and get their bearings from attending to the landscape itself rather than from some inner representation of the same. Importantly, Myers notes that among the Pintupi the meanings of songs remain obscure to those who do not already know the country, and that individuals who are new to an area are first instructed by being 'taken around, shown some of the significant places, and taught to avoid certain sites' (Myers 1986: 150). One might question what use songs, stories and designs could possibly have *as maps* if they are unintelligible to all but those who possess such familiarity with the landscape as to manage quite well without devices of this kind.

I do not believe, however, that their purpose is a representational one. Telling a story is not like weaving a tapestry to *cover up* the world or, as in an overworn anthropological metaphor, to 'clothe it with meaning'. For the landscape, unclothed, is not the 'opaque surface of literalness' (Ho 1991) that this analogy suggests. Rather, it has both transparency and depth: transparency, because one can see into it; depth, because the more one looks the further one sees. Far from dressing up a plain reality with layers of metaphor, or representing it, map-like, in the imagination, songs, stories and designs serve to conduct the attention of performers *into* the world, deeper and deeper, as one proceeds from outward appearances to an ever more intense poetic involvement. At its most intense, the boundaries between person and place, or between the self and the landscape, dissolve altogether. It is at this point that, as the people say, they become their ancestors, and discover the real meaning of things.

Conventional anthropological interpretation tends to range, on two sides of a dichotomy, peoples' practical-technical interaction with environmental resources in the context of subsistence activities, and their mytho-religious or cosmological construction of the environment in the context of ritual and ceremony. Hunters and gatherers are said to be distinctive, however, insofar as they do not seek physically to reconstruct the landscape to conform with their cosmological conceptions, but rather find these conceptions 'ready made' in the world as given. On these grounds they are supposed still to occupy a 'natural' rather than an 'artificial' or 'built' environment. Peter Wilson sets out this view very clearly:

> The hunter/gatherer pins ideas and emotions onto the world as it exists: the landscape is turned into a mythical topographical map, a grid of ancestor tracks and sacred sites, as is typical among Australian aborigines . . . A construction is put upon the landscape rather than the landscape undergoing a reconstruction, as is the case among sedentary peoples, who impose houses, villages, and gardens on the landscape, often in place of natural landmarks. Where nomads read or even find cosmological features in an already existing landscape, villagers tend to represent and model cosmic ideas in the structures they build.
>
> (1988: 50)

Once again, we find that the view of the landscape as culturalised space entails the naturalisation of hunting and gathering. Only as represented in thought is the environment drawn into the human world of persons; thus the practical business of life is reduced to material interactions in an alien world of nature, in which humans figure as 'mere organisms'.

Yet the people themselves insist that the real-world landscape in which they move about, set up camp and hunt and gather, is not alien at all but infused with human meaning – that this meaning has not been 'pinned on' but is there to be 'picked up' by those with eyes to see and ears to hear. They are, as their ethnographers have noted (with some surprise, else they would not have cared to remark on the fact), thoroughly 'at home' in the world. The Pintupi, Myers tells us, 'seem truly at home as they walk through the bush, full of confidence' (1986: 54). And the lands of the Koyukon, according to Nelson, 'are no more a wilderness than are farmlands to a farmer or streets to a city dweller' (1983: 246). As this statement implies, it is not because of his occupancy of a built environment that the urban dweller feels at home on the streets; it is because they are the streets of his neighbourhood along which he is accustomed to walk or drive in his everyday life, presenting to him familiar faces, sights and sounds. And it is no different, in principle, for the hunter-gatherer, as the inhabitant of an environment unscarred by human engineering. As I have remarked elsewhere, 'it is through *dwelling* in a landscape, through the incorporation of its features into a pattern of everyday activities, that it becomes home to hunters and gatherers' (Ingold 1996a: 116).

My argument is that the differences between the activities of hunting and gathering, on the one hand, and singing, storytelling and the narration of myth on the other, cannot be accommodated within the terms of a dichotomy between the material and the mental, between ecological interactions *in* nature and cultural constructions *of* nature. On the contrary, both sets of activities are, in the first place, ways of dwelling. The latter, as I have shown, amount not to a metaphorical representation of the world, but to a form of poetic involvement. But it is no different with the activities of hunting and gathering, which entail the same attentive engagement with the environment, and the same exploratory quest for knowledge. In hunting and gathering, as in singing and storytelling, the world 'opens out' to people. Hunter-gatherers, in their practices, do not seek to transform the world; they seek revelation. The intentions of non-human animals, for example, are revealed to Cree hunters in the outcomes of their endeavours. And Pintupi are forever alert to signs in the landscape that may offer new clues to ancestral activity in the Dreaming (Myers 1986: 67). In short, through the practical activities of hunting and gathering, the environment – including the landscape with its fauna and flora – enters directly into the constitution of persons, not only as a source of nourishment but also as a source of knowledge.

But reciprocally, persons enter actively into the constitution of their environments. They do so, however, from *within*. For the Pintupi, the world was created in the Dreaming, but the Dreaming is *trans*historical, not *pre*historical. The events of the Dreaming, though they occurred at particular places, are themselves timeless, each one stretched to encompass an eternity, or what Stanner (1965: 159) called 'everywhen'. And so the landscape, brought into being in these events, is movement out of time. People, as the temporal incarnation of ancestral beings, are not so much creators themselves as living on the *inside* of an eternal moment of creation. Their activities, which replicate on a much smaller scale the landforming activities of the ancestors, are therefore part and parcel of the becoming of the world, and are bound to follow the course set by the Dreaming: life, as the Pintupi

say, is a 'one-possibility thing' (Myers 1986: 53). Likewise, Koyukon are bound to the course of the Distant Time, and must move with it, never against it (Nelson 1983: 240). This understanding of the landscape as a course to be followed could hardly be more different from the Western understanding of the natural environment as a resistance to be overcome, a physically given, material substrate that has first to be 'humanised', by imposing upon it forms whose origins lie in the imagination, before it can be inhabited.

What do hunters and gatherers actually do?

To this day, the anthropological status of hunters and gatherers has remained equivocal, to say the least. Though no-one would any longer deny them full membership of the human species, it is still commonly held that in deriving their subsistence from hunting and trapping 'wild' animals and gathering 'wild' plants, honey, shellfish and so on, they are somehow comparable in their mode of life to non-human animals in a way that farmers, herdsmen and urban dwellers are not. Nothing is more revealing of this attitude than the commonplace habit of denoting the activities of hunting and gathering by the single word 'foraging'. I am not concerned here with the narrow sense of foraging in which it has sometimes been contrasted with collecting (see, for example, Binford 1983: 339–46, Ingold 1986a: 82–7). I mean rather to draw attention to the way in which 'foraging' has been adopted in a very general sense as a shorthand for 'hunting and gathering', ostensibly on the grounds of simple convenience. 'Forager', it is argued, is less cumbersome than 'hunter-gatherer', and the term carries no unwarranted implications as regards the relative priority of animal and vegetable foods, or of male and female labour.

But the concept of foraging also has an established usage in the field of ecology, to denote the feeding behaviour of animals of all kinds, and it is by extension from this field that the anthropological use of the term is explicitly derived. Thus, introducing a volume of studies on 'hunter-gatherer foraging strategies', Winterhalder and Smith note that 'the subsistence patterns of human foragers are fairly analogous to those of other species and are thus more easily studied with ecological models' (1981: x). And it is precisely the definition of human foragers as those who do *not* produce their food that legitimates the comparison: 'Foraging refers inclusively to tactics used to obtain nonproduced foodstuffs or other resources, those not directly cultivated or husbanded by the human population' (Winterhalder 1981b: 16). In short, it appears that humans can be only either foragers or producers; if the former, their subsistence practices are analogous to those of non-human animals; if the latter, they are not. The producer is conceived to intervene in natural processes, from a position at least partially outside it; the forager, by contrast, is supposed never to have extricated him- or herself from nature in the first place.

I have argued in this chapter that the world as perceived by hunters and gatherers is constituted through their engagement with it, in the course of everyday, subsistence-related practices. These practices cannot be reduced to their narrowly behavioural aspect, as strategically programmed responses to external environmental stimuli, as implied in the notion of foraging. Nor, however, can they be regarded as planned interventions in nature, launched from the separate platform of society, as implied in the notion of production. *Neither foraging nor production is an adequate description of what hunters and gatherers do.* As an alternative, Bird-David suggests 'procurement':

> Distinguished from 'to produce' and 'production', as also from 'to forage' and 'foraging', 'to procure' (according to the Shorter Oxford Dictionary) is 'to bring about, to obtain

by care or effort, to prevail upon, to induce, to persuade a person to do something'. 'Procurement' is management, contrivance, acquisition, getting, gaining. Both terms are accurate enough for describing modern hunter-gatherers who apply care, sophistication and knowledge to their resource-getting activities.

<div style="text-align: right">(1992b: 40)</div>

This is a suggestion I would endorse. The notion of procurement nicely brings out what I have been most concerned to stress: that the activities we conventionally call hunting and gathering are forms of skilled, attentive 'coping' in the world, intentionally carried out by persons in an environment replete with other agentive powers of one kind and another. The point may be most readily summarised by referring back to Figure 3.2. In the upper diagram, representing the Western ontology, foraging would be positioned as an interaction in the plane of nature, between the human organism and its environment, whereas production would appear as an intervention in nature from the separate plane of society. In the lower diagram, representing the hunter-gatherer ontology, there is but one plane, in which humans engage, as whole organism-persons, with components of the environment, in the activities of procurement.

My argument has been that the 'naturalisation' of the activities of hunting and gathering, as revealed in their apparently unproblematic redesignation as 'foraging', is a product of the 'culturalisation' of the perceived environment. In the case of hunter-gatherers of the tropical forest, we have seen how their perception of the forest environment, as being in some respects like a human parent, has been interpreted anthropologically as due to the application of a schema for metaphorically constructing it, and how, as a result, the forest itself and hunter-gatherers' interactions with it come to be excluded from the domain in which they relate to one another as persons. In the case of the northern hunters, we have likewise seen how the assumption that in their capacity as persons, humans can relate to animals only as the latter are represented within human intentional worlds, leads to the placement of real encounters of hunting beyond the bounds of these intentional worlds, in a separate domain designated as 'natural'. And finally, in examining Aboriginal perceptions of the landscape, we found that by treating the perceived world as culturalised space, the real-world landscape in which people live and move comes to be rendered as an indifferent and impersonal physical substrate, raw material for imaginative acts of world-making.

In short, a cultural constructionist approach to environmental perception, far from challenging the prevailing ecological models of hunting and gathering as foraging, actually reinforces them, creating by exclusion a separate logical space for organism–environment interactions wherein these models are appropriately applied. Those who oppose the designation of hunter-gatherers as foragers (for example, Bird-David 1992b: 38) often do so on the grounds that it makes them seem just like non-human animals, without however questioning the applicability of the foraging model to the animals themselves. I believe that by paying attention to what hunter-gatherers are telling us, this is just what we *should* be questioning, and in doing so laying down a challenge not only to cultural anthropology but to ecological science as well. We may admit that humans are, indeed, just like other animals; not, however, insofar as they exist as organisms rather than persons, as constituent entities in an objective world of nature presented as a spectacle to detached scientific observation, but by virtue of their mutual involvement, as undivided centres of action and awareness, within a continuous life process. In this process, the relations that human beings have with one another form just one part of the total field of relations embracing all living things (Ingold 1990: 220).

There can, then, be no radical break between social and ecological relations; rather, the former constitute a *subset* of the latter. What this suggests is the possibility of a new kind of ecological anthropology, one that would take as its starting point the active, perceptual engagement of human beings with the constituents of their world – for it is only from a position of such engagement that they can launch their imaginative speculations concerning what the world is like. The first step in the establishment of this ecological anthropology would be to recognise that the relations with which it deals, between human beings and their environments, are not confined to a domain of 'nature', separate from, and given independently of, the domain in which they lead their lives as persons. For hunter-gatherers as for the rest of us, life is given in engagement, not in disengagement, and in that very engagement the real world at once ceases to be 'nature' and is revealed to us as an environment for people. Environments are constituted in life, not just in thought, and it is only because we live in an environment that we can think at all.

Chapter Four

From trust to domination
An alternative history of human–animal relations

Just as humans have a history of their relations with animals, so also animals have a history of their relations with humans. Only humans, however, construct *narratives* of this history. Such narratives range from what we might regard as myths of totemic origin to supposedly 'scientific' accounts of the origins of domestication. And however we might choose to distinguish between myth and science, if indeed the distinction can be made at all, they have in common that they tell us as much about how the narrators view their own humanity as they do about their attitudes and relations to non-human animals. In this chapter I aim to show that the story we tell in the West about the human exploitation and eventual domestication of animals is part of a more encompassing story about how humans have risen above, and have sought to bring under control, a world of nature that includes their *own* animality.

In this story, a special role is created for that category of human beings who have yet to achieve such emancipation from the natural world: known in the past as wild men or savages, they are now more politely designated as hunters and gatherers. I shall be looking at how hunter-gatherers have come to be stereotypically portrayed, in Western anthropological accounts, as surviving exemplars of the 'natural' condition of mankind, and more particularly at how this is reflected in the depiction of hunters' relations towards their animal prey. I shall then go on to contrast this depiction with the understandings that people who actually live by hunting and gathering have of their relations with the environmental resources on which they depend: again, since our concern is specifically with relations towards animals, I shall concentrate on hunting rather than gathering whilst recognising, of course, that it is not a simple matter to determine where the former ends and the latter begins (Ingold 1986a: 79–100).

Taking the hunter-gatherer understandings as a baseline, I shall attempt to construct an alternative account of the transformation in human–animal relations that in Western discourse comes under the rubric of domestication. My concern, in particular, will be to contrast human–animal relations under a regime of hunting with those under a regime of pastoralism. And a leading premise of my account will be that the domain in which human persons are involved as social beings with one another cannot be rigidly set apart from the domain of their involvement with non-human components of the environment. Hence, any qualitative transformation in environmental relations is likely to be manifested similarly both in the relationships that humans extend towards animals and in those that obtain among themselves in society.

HUMANITY, NATURE AND HUNTER-GATHERERS

Let me begin, then, with the portrayal of the savage hunter-gatherer in Western literature.[1] There are countless instances, especially in the writings of nineteenth-century anthropologists, of pronouncements to the effect that hunter-gatherers 'live like animals' or 'live little better than animals'. Remarks of this kind carry force only in the context of a belief that the proper destiny of human beings is to *overcome* the condition of animality to which the life of all other creatures is confined. Darwin, for example, found nothing shocking, and much to marvel at, in the lives of non-human animals, yet his reaction on encountering the native human inhabitants of Tierra del Fuego, during his round-the-world voyage in the *Beagle*, was one of utter disgust. 'Viewing such men', he confided to his journal, 'one can hardly make oneself believe that they are fellow-creatures and inhabitants of the same world' (Darwin 1860: 216). It was not just that their technical inferiority left them completely at the mercy of their miserable environment; they also had no control over their own impulses and desires, being by nature fickle, excitable and violent. 'I could not have believed', Darwin wrote, 'how wide was the difference between savage and civilised man; it is greater than between a wild and domesticated animal, inasmuch as in man there is a greater power of improvement' (1860: 208).

Now Darwin, like many of his contemporaries and followers, was in no doubt that these human hunter-gatherers were innately inferior to modern Europeans. This is a view that no longer commands acceptance today. If you wanted to compare, say, the innate capacities of humans and chimpanzees, it should make no difference whatever whether your human subjects were – say – Tasmanian Aboriginal hunter-gatherers or British airline pilots.[2] Nevertheless the belief persists in many quarters that even though hunter-gatherers are fully human so far as their species membership is concerned, they continue to live alongside other animals within a pristine world of nature. Indeed this idea of hunters and gatherers, as the human inhabitants of such a world, is virtually given by definition. To see why this should be so, we need to return to that very dichotomy which Darwin used as the measure of the distance from savagery to civilisation, namely that between the wild and the domestic.

Hunting and gathering, of course, are terms that denote particular kinds of activities. How, then, are these activities to be defined? The conventional answer is that hunters and gatherers exploit 'wild' or *non-domesticated* resources, whereas farmers and herdsmen exploit *domesticated* ones (see, for example, Ellen 1982: 128). The precise meaning of domestication has remained a topic of scholarly debate for well over a century, and I shall return in a moment to examine some of the suppositions that underlie this debate. Suffice it to say at this point that every one of the competing definitions introduces some notion of human control over the growth and reproduction of animals and plants. Wild animals, therefore, are *animals out of control*. Hunter-gatherers, it seems, are no more able to achieve mastery over their environmental resources than they are to master their own internal dispositions. They are depicted as though engaged, like other animal predators, in the continual pursuit of fugitive prey, locked in a struggle for existence which – on account of the poverty of their technology – is not yet won. Indeed the ubiquity, in Western archaeo-zoological literature, of the metaphors of pursuit and capture is extremely striking: hunters forever pursue, but it is capture that represents the decisive moment in the onset of domestication (Ducos 1989: 28). Feral animals, in turn, are likened to convicts on the loose. Notice how the relation between predator and prey is presented as an essentially antagonistic one, pitting the endurance and cunning of the hunter against the capacities

for escape and evasion of his quarry, each continually augmented by the other through the ratchet mechanism of natural selection. The encounter, when it comes, is forcible and violent.

Behind this opposition between the wild and the domestic there lies a much more fundamental metaphysical dualism – one that seems peculiar to the discourse which, as a convenient shorthand, we can call 'Western', to the extent of being its defining feature. This is the separation of two, mutually exclusive domains of being to which we attach the labels 'humanity' and 'nature'. All animals, according to the principle of this separation, belong wholly in the world of nature, such that the differences between species are differences within nature. Humans, however, are the sole exception: they are different because the essence of their humanity *transcends* nature; and by the same token, that part of them that remains *within* nature presents itself as an undifferentiated amalgam of animal characteristics (Ingold 1990: 210). Thus human beings, uniquely among animals, live a two-tier existence, half-in nature and half-out, both as organisms with bodies and as persons with minds. Now as Raymond Williams has pointed out:

> to speak of man 'intervening' in natural processes is to suppose that he might find it possible not to do so, or decide not to do so. Nature has to be thought of . . . as separate from man, before any question of intervention or command, and the method and ethics of either, can arise.
>
> (1972: 154)

It follows that when we speak of domestication as an intervention in nature, as we are inclined to do, humanity's transcendence over the natural world is already presupposed.

The same goes for the concept of production, classically defined by Friedrich Engels as 'the transforming reaction of man on nature' (1934: 34). In order to produce, humans have to achieve such command or mastery over nature as to be able to impress their own, calculated designs upon the face of the earth. Thus 'the further removed men are from animals, . . . the more their effect on nature assumes the character of premeditated, planned action directed towards definite preconceived ends' (Engels 1934: 178). In other words, to the extent that the human condition transcends nature, so nature herself comes to stand as raw material to human projects of construction. In their realisation, these projects establish a division, within the material world, between the natural and the artificial, the pristine and the man-made, nature-in-the-raw and nature transformed. Hunters and gatherers, as the human inhabitants of a still pristine environment, cannot produce, for in the very act of production the world is irreversibly altered from its natural state. The virgin forest, for example, becomes a neatly ordered patchwork of cultivated fields, naturally occurring raw materials are turned into tools and artefacts, and plants and animals are bred to forms that better serve human purposes. The field, the plough and the ox, though they all belong to the physical world, have been engineered to designs that in every case had their origins in the minds of men, in human acts of envisioning.

Since our present concern is with the history of human–animal relations, or rather with a particular narration of that history, I want to stress the way 'domestication' figures in this account as a feat of engineering, as though the ox were man-made, an artificial construction put together like the plough. Of course the possibility of actually engineering animals has opened up only very recently, and remains more in the realm of fiction than fact. Darwin, to his credit, was at pains to stress that the power of humans to intervene in natural processes is in reality rather limited: above all, humans cannot *create* novel

variants, but can only select retroactively from those that arise spontaneously. 'It is an error', Darwin wrote, 'to speak of man "tampering with nature" and causing variability' (1875: 2). Nevertheless, and despite Darwin's careful distinction between intentional and unintentional selection, the belief has persisted that the husbandry of animals, to qualify at all as productive activity, must necessarily entail the deliberate, planned modification of the species involved. Now for pastoralists and farmers, who cannot exactly engineer the forms or behaviours of their animals and plants, the nearest they can come to it is 'controlled breeding' (Bökonyi 1969: 219; 1989: 22). And so it is in the modifications brought about by such breeding – or more technically by 'artificial selection' – that the essence of domestication has been supposed to lie. Thus it came to be assumed that to husband animals was, in essence, to breed them, both practices being lumped indiscriminately under the concept of domestication. Instances where one appeared without the other, such as the reindeer of northern Eurasian pastoralists which fall within the range of variation of the 'wild' form (Ingold 1980: Ch. 2), were dismissed as unstable, transitional states of 'semi-domestication'.

The separation of humanity and nature implicit in the definition of domestication as a process of artificial selection reappears in a competing definition which emphasises its social rather than its biological aspect. 'Domestication', Ducos writes, 'can be said to exist when living animals are integrated as objects into the socio-economic organisation of the human group' (1978: 54; 1989; see also Ingold 1986a: 113, 168, 233). They become a form of property which can be owned, inherited and exchanged. Property, however, is conceived here as a relation between persons (subjects) in respect of things (objects), or more generally, as a social appropriation of nature. Human beings, as social persons, can own; animals, as natural objects, are only ownable. Thus the concept of appropriation, just as the concept of intervention, sets humanity, the world of persons, on a pedestal above the natural world of things. As I have remarked elsewhere, in connection with the concept of land tenure, 'one cannot appropriate that within which one's being is wholly contained' (Ingold 1986a: 135). It follows that hunters and gatherers, characterised in Western discourse as exemplars of man in the state of nature, 'at or near the absolute zero of cultural development' (*ibid.*), can no more own their resources than they can intervene in their reproductive processes. The advent of domestication, in both senses, had to await the breakthrough that liberated humanity from the shackles of nature, a breakthrough that was marked equally by the emergence of institutions of law and government, serving to shackle *human* nature to a social order.

Implied here is the evolutionary premise that the level of being that sets mankind above the animal kingdom had to be *achieved*, in the course of an ascent from savagery to civilisation, just as it has to be achieved in the development of every individual from childhood to maturity.[3] That man's rise to civilisation was conceived to have had its counterpart in the domestication of nature is evident from the interchangeable use of the concept of culture to denote both processes. Edward Tylor's *Primitive Culture* of 1871, the first comprehensive study of human cultural variation, began with the words 'Culture or Civilisation', by which he meant the cultivation of intellectual potentialities common to humanity (1871, I: 1, see Ingold 1986b: 44). Darwin, for his part, introduced his equally compendious study, *The variation of animals and plants under domestication*, with the remark that 'from a remote period, in all parts of the world, man has subjected many animals and plants to domestication or culture' (1875: 2). The cultivation of nature thus appears as the logical corollary of man's cultivation of himself, of his own powers of reason and morality. As the former gave rise to modern domesticated breeds, so did the latter

culminate in the emergence of that most perfect expression of the human condition, namely civil society.

Let me conclude this section by returning to Darwin's observation of the native inhabitants of Tierra del Fuego. When it came to his own kind, Darwin remained forever convinced of the necessity and inevitability of progress towards civilisation, yet he was unequivocal in his estimation that the Fuegians had not made it. In the spheres of religion, law, language and technology, they fell far short of a truly human level of existence. Thus:

> We have no reason to believe that they perform any sort of religious worship, . . . their different tribes have no government or chief, . . . the language of these people, according to our notions, scarcely deserves to be called articulate, . . . their [technical] skill in some respects may be compared to the instinct of animals, for it is not improved by experience.
>
> (1860: 208, 217–18)

Biologically, Darwin seems to be saying, these people are certainly human beings, they are of the same species as ourselves, yet in terms of their level of civilisation they are so far from *being human* that their existence may justifiably be set on a par with that of the animals. That being so, any influence that they may have had on the non-human animals in their environment, and on which they depend, cannot differ in kind from the influence that such animals have had on one another.

How hunters and gatherers relate to their environments

So much for the construction of hunter-gatherers, as *somewhat ambiguously* human, within the framework of concepts bequeathed by Western thought. Let me turn now to the hunter-gatherers themselves. How do those peoples who derive a livelihood, at least in part, from hunting and gathering, actually relate to the manifold constituents of their environments?

Much of our information about the traditional ways of life of hunters and gatherers – prior to their transformation or destruction in the wake of European invasion of their lands – comes from the writings of early anthropologists, missionaries, traders and explorers. They tended to depict hunter-gatherer life as a constant struggle for existence. Equipped with the most rudimentary technology in a harsh environment, hunters and gatherers were thought to have to devote every moment of their lives to the quest for food. In this respect, Darwin's description of the natives of Tierra del Fuego, apparently beset by hunger and famine and without the wit to improve their miserable condition, was entirely typical. More recent ethnographic studies, however, have shown this picture to be grossly exaggerated, if not entirely false. The new view of hunter-gatherer economy that emerged from these studies was put forward in its most outspoken form in a now celebrated article by Marshall Sahlins, originally presented to the 1966 Symposium on 'Man the Hunter', and provocatively entitled 'The original affluent society' (subsequently revised and published in Sahlins 1972: Ch. 1).

Unlike the individual in modern Western society who always wants more than he can get, however well-off he may be, the wants of the hunter-gatherer, Sahlins argued, are very limited. What one has, one shares, and there is no point in accumulating material property that would only be an impediment, given the demands of nomadic life. Moreover,

for hunter-gatherers who know how to get it, food is always abundant. There is no concept of scarcity. Hunter-gatherers fulfil their limited needs easily and without having to expend very much effort. Two points go along with this. The first is an apparent lack of foresight, or of concern for the future. Hunter-gatherers, in Sahlins's depiction, take what they can get opportunistically, as and when they want it. And what they have they consume. The important thing, for them, is that food should 'go round' rather than that it should 'last out'. Whatever food is available is distributed so that everyone has a share, even though this means that there may be none left on the morrow. No attempt is made to ration food out from one day to the next, as explorers do when they go on expeditions. After all, for hunter-gatherers the 'expedition' is not time out from ordinary life but is rather life itself, and this life rests on the assumption that more food will eventually be found (Ingold 1986a: 211–12). The second point, which follows directly from this, is that hunter-gatherers are unconcerned about the storage of food. Stored surpluses impede mobility, and given that food is all around in the environment, hunter-gatherers treat the environment itself as their storehouse, rather than setting aside supplies of harvested food for the future.

One of the studies on which Sahlins drew for evidence in presenting this picture of hunter-gatherer affluence was that undertaken by James Woodburn, of the Hadza of Tanzania. But Woodburn himself, in a series of recent articles, has sought to qualify this view by distinguishing between different *kinds* of hunter-gatherer economy (Woodburn 1980, 1982, 1988). The major distinction is between what he calls *immediate-return* and *delayed-return* economies. In an immediate-return system, people go out on most days to obtain food, which they consume on the day they obtain it or very soon after. The equipment they use is simple and quickly made without involving much time or effort, nor do they invest any effort in looking after the resources they exploit. Moreover, there is little or no storage of harvested food. This picture, according to Woodburn, is consistent with the Hadza data, and also with Sahlins's general picture of hunter-gatherer affluence. In a delayed-return system, by contrast, there may be a substantial advance investment of labour in the construction of hunting or trapping facilities or (for fishermen) boats and nets. People might devote considerable effort to husbanding their resources, and there may also be extensive storage.

The significance of this distinction lies in what it suggests about peoples' commitments both to the non-human environment and to one another. Such commitments, Woodburn thinks, are likely to be far greater in a delayed-return system than in an immediate-return one. Obviously, people depend in an immediate-return system, just as much as they do in a delayed-return one, both on the resources of their environment and on the support of other people. But what is striking about the immediate-return system is the lack of investment in, or commitment towards, *particular* resources or persons. An individual, say in Hadza society, relies on other people in general, and on the resources of the environment in general, rather than building up relationships with particular people and particular resources. As Woodburn puts it, 'people are not dependent on *specific* other people, for access to basic requirements' (1982: 434).

The more, however, that we learn about hunter-gatherer perceptions of the environment, and of their relations with it, the more unlikely this picture of the immediate-return system seems. If what Woodburn says about the Hadza is correct, then they appear more as the exception than the rule. Over and over again we encounter the idea that the environment, far from being seen as a passive container for resources that are there in abundance for the taking, is saturated with personal powers of one kind or another. It is alive.[4] And

hunter-gatherers, if they are to survive and prosper, have to maintain relationships with these powers, just as they must maintain relationships with other human persons. In many societies, this is expressed by the idea that people have to *look after* or *care for* the country in which they live, by ensuring that proper relationships are maintained. This means treating the country, and the animals and plants that dwell in it, with due consideration and respect, doing all one can to minimise damage and disturbance.

Let me present one example, which will serve to direct our attention from the general context of hunters' and gatherers' relations with the environment towards the more specific context of the hunters' relations with their animal prey. The Cree of northeastern Canada, as we saw in Chapter One (pp. 13–14), suppose that animals intentionally present themselves to the hunter to be killed. The hunter consumes the meat, but the soul of the animal is released to be reclothed with flesh. Hunting here, as among many northern peoples, is conceived as a rite of regeneration: consumption follows killing as birth follows intercourse, and both acts are integral to the reproductive cycles, respectively, of animals and humans. However, animals will not return to hunters who have treated them badly in the past. One treats an animal badly by failing to observe the proper, respectful procedures in the processes of butchering, consumption and disposal of the bones, or by causing undue pain and suffering to the animal in killing it. Above all, animals are offended by *unnecessary* killing: that is, by killing as an end in itself rather than to satisfy genuine consumption needs. They are offended, too, if the meat is not properly shared around all those in the community who need it. Thus, meat and other usable products should on no account be wasted (see Feit 1973, Tanner 1979, Brightman 1993, cf. Ingold 1986a: 246–7).

This emphasis on the careful and prudent use of resources, and on the avoidance of waste, seems a far cry from the image, presented by Sahlins, of original affluence, of people opportunistically collecting whatever is on offer. Moreover the idea that success in present hunting depends on personal relationships built up and maintained with animal powers through a history of previous hunts, quite contradicts Woodburn's notion of immediate returns. For in the Cree conception, the meat that the hunter obtains now is a return on the investment of attention he put in on a previous occasion – when hunting the same animal or its conspecifics – by observing the proper procedures. Indeed it could be argued that in their concern to look after their environments, and to use them carefully, hunter-gatherers practise a conscious policy of conservation. They could, in other words, be said to manage their resources, as has actually been suggested in one recent collection of anthropological studies of North American and Australian hunter-gatherers, which was pointedly entitled *Resource Managers* (Williams and Hunn 1982).

Yet the environmental conservation practised by hunter-gatherers, if such it is, differs fundamentally from the so-called 'scientific' conservation advocated by Western wildlife protection agencies. Scientific conservation is firmly rooted in the doctrine, which I have already spelled out, that the world of nature is separate from, and subordinate to, the world of humanity. One corollary of this doctrine is the idea that merely by virtue of inhabiting an environment, humans – or at least civilised humans – are bound to transform it, to alter it from its 'natural' state. As a result, we tend to think that the only environments that still exist in a genuinely natural condition are those that remain beyond the bounds of human civilisation, as in the dictionary definition of a *wilderness*: 'A tract of land or a region . . . uncultivated or uninhabited by human beings'. Likewise the wild animal is one that lives an authentically natural life, untainted by human contact. It will, of course, have contacts with animals of many other, non-human species, but whereas

these latter contacts are supposed to reveal its true nature, any contact with human beings is supposed to render the animal 'unnatural', and therefore unfit as an object of properly scientific inquiry. Juliet Clutton-Brock (1994) has drawn our attention to the way in which, by according to domestic animals a second-class status in this regard, the investigation of their behaviour has been impeded. Domestic animals, it seems, are to be exploited but not studied; wild animals to be studied but not exploited.

Scientific conservation operates, then, by sealing off portions of wilderness and their animal inhabitants, and by restricting or banning human intervention. This is like putting a 'do not touch' notice in front of a museum exhibit: we can observe, but only from a distance, one that excludes direct participation or active 'hands-on' involvement. It is consequently no accident that regions designated as wilderness, and that have been brought under externally imposed regulations of conservation, are very often regions inhabited by hunters and gatherers. Allegedly lacking the capability to control and transform nature, they alone are supposed to occupy a still unmodified, 'pristine' environment. The presence of indigenous hunter-gatherers in regions designated for conservation has often proved acutely embarrassing for the conservationists. For there is no way in which native people can be accommodated within schemes of scientific conservation except as *parts of the wildlife*, that is as constituents of the nature that is to be conserved. They cannot themselves be conservers, because the principles and practice of scientific conservation enjoin a degree of detachment which is incompatible with the kind of involvement with the environment that is essential to hunting and gathering as a way of life.

The sense in which hunters and gatherers see themselves as conservers or custodians of their environments should not, then, be confused with the Western scientific idea of conservation. This latter, as I have shown, is rooted in the assumption that humans – as controllers of the natural world – bear full responsibility for the survival or extinction of wildlife species. For hunter-gatherers this responsibility is inverted. In the last resort, it is those powers that animate the environment that are responsible for the survival or extinction of humans. Summarising the view of the Koyukon of Alaska, Richard Nelson writes:

> The proper role of humankind is to serve a dominant nature. The natural universe is nearly omnipotent, and only through acts of respect and propitiation is the well-being of humans ensured . . . In the Koyukon world, human existence depends on a morally based relationship with the overarching powers of nature. Humanity acts at the behest of the environment. The Koyukon must move *with* the forces of their surroundings, not attempting to control, master or fundamentally alter them. They do not confront nature, they yield to it.
>
> (Nelson 1983: 240)

For the Koyukon, as for other hunting and gathering peoples, there are not two separate worlds, of humanity and nature. There is one world, and human beings form a rather small and insignificant part of it.

Given this view of the world, everything depends on maintaining a proper balance in one's relationships with its manifold powers. Thus, rather than saying that hunters and gatherers exploit their environments, it might be better to say that they aim to keep up a dialogue with it. I shall turn in the next section to what this means in terms of hunters' relations with animals. At this juncture, the point I wish to stress is that for hunters and gatherers, *there is no incompatibility between conservation and participation*. It is through a direct engagement with the constituents of the environment, not through a detached,

hands-off approach, that hunters and gatherers look after it. Indeed, caring for an environment is like caring for people: it requires a deep, personal and affectionate involvement, an involvement not just of mind or body but of one's entire, undivided being. We do not feel forced in the social world – for example in the field of our relations with kin – to choose between either exploiting others for personal profit or avoiding all direct contact. Yet in the context of relations with animals, this is precisely the choice that is forced on us by the conventional dichotomy between wildness and domestication. It is time now to suggest some alternative terms.

FROM TRUST TO DOMINATION

Trust

It should by now be clear that the characterisation of hunting as the human pursuit of animals that are 'wild', though it speaks volumes about our Western view of hunters, is quite inappropriate when it comes to the hunters' view of animals. For the animals are not regarded as strange, alien beings from another world, but as participants in the same world to which the people also belong. They are not, moreover, conceived to be bent on escape, brought down only by the hunter's superior cunning, speed or force. To the contrary, a hunt that is successfully consummated with a kill is taken as proof of amicable relations between the hunter and the animal that has willingly allowed itself to be taken. Hunters are well-known for their abhorrence of violence in the context of human relations,[5] and the same goes for their relations with animals: the encounter, at the moment of the kill, is – to them – essentially *non*-violent. And so, too, hunting is not a failed enterprise, as it is so often depicted in the West: a failure marked by the technical inability to assert or maintain control; pursuit that is not ultimately crowned by capture. It is rather a highly successful attempt to draw the animals in the hunters' environment into the familiar ambit of social being, and to establish a working basis for mutuality and coexistence.

For hunters and gatherers, animals and plants in the environment play a nurturing role, as do human caregivers. This is the kind of understanding that Nurit Bird-David seeks to convey by means of her notion, introduced in the previous chapter (pp. 43–4), of 'the giving environment' (Bird-David 1990). Focusing on peoples of the tropical forest for whom gathering is rather more important than hunting, Bird-David suggests that hunters and gatherers model their relationships with life-giving agencies in their environments on the institution of sharing, which is the foundation for interpersonal relations within the human community. Thus in their nurturing capacity, these non-human agencies 'share' with you, just as you share what you receive from the environment with other people. Both movements, from non-human to human beings and among the latter themselves, are seen to constitute a single 'cosmic economy of sharing' (Bird-David 1992a). However, while people may indeed draw an analogy between the relations with animals and plants activated in hunting and gathering, and the relations among humans activated in sharing, it seems to me that these two sets of relations are, at a more fundamental level of principle, not just analogous but identical. This principle which, I maintain, inheres equally in the activities of sharing and in those of hunting and gathering, is that of *trust*.

The essence of trust is a peculiar combination of *autonomy* and *dependency*. To trust someone is to act with that person in mind, in the hope and expectation that she will do

likewise – responding in ways favourable to you – so long as you do nothing to curb her autonomy to act otherwise. Although you depend on a favourable response, that response comes entirely on the initiative and volition of the other party. Any attempt to *impose* a response, to lay down conditions or obligations that the other is bound to follow, would represent a betrayal of trust and a negation of the relationship. For example, if I force my friend to assist me in my enterprise, this is tantamount to a declaration that I do not trust him to assist me of his own accord, and therefore that I no longer count him as a friend at all. Offended by my infidelity, his likely response will be to withdraw his favour towards me. Trust, therefore, always involves an element of risk – the risk that the other on whose actions I depend, but which I cannot in any way control, may act contrary to my expectations (see Gambetta 1988, for some excellent discussions of this point).

Now this combination of autonomy and dependency is, I believe, the essence of what is commonly reported in ethnographic studies of hunting and gathering societies under the rubric of sharing. People in hunter-gatherer communities *do* depend on one another for food and for a variety of everyday services, though these exchanges may be the surface expression of a deeper concern with *companionship*, characterised by Tom Gibson as 'shared activity in itself' (Gibson 1985: 393). Noteworthy in Gibson's account is the connection he draws between companionship and autonomy: 'a relationship based on companionship is voluntary, freely terminable and involves the preservation of the personal autonomy of both parties' (1985: 392). He contrasts this kind of relationship with the kind that is involuntary, non-terminable and places the parties under obligation (see Ingold 1986a: 116–17). Bird-David (1990) draws essentially the same contrast under the terms 'giving' and 'reciprocating', referring respectively to the relationships that hunter-gatherers and cultivators see themselves as having with the environment of the tropical forest. Clearly, both hunter-gatherers and cultivators depend on their environments. But whereas for cultivators this dependency is framed within a structure of reciprocal obligation, for hunter-gatherers it rests on the recognition of personal autonomy. In my terms, the contrast is between relationships based on *trust* and those based on *domination*. I shall turn to the latter in a moment, but first I should like to specify more precisely the meaning of trust in the context of relations between hunters and their animal prey.

I shall do so by drawing a further, analytic distinction between *trust* and *confidence* (following Luhmann 1988). Both terms are commonly and casually used in characterisations of hunter-gatherer attitudes towards the environment. Sahlins, for example, uses the terms freely and interchangeably in his account of the 'pristine affluence' of hunter-gatherer economic arrangements, marked, he claims, by

> a *trust* in the abundance of nature's resources rather than despair at the inadequacy of human means. My point is that otherwise curious heathen devices became understandable by the people's *confidence*, a confidence which is the reasonable human attribute of a generally successful economy.
>
> (1972: 29, my emphases)

Now Sahlins writes as though, for hunters and gatherers, the environment existed as a world of nature 'out there', quite separate from the world of human society and its interests. In this he uncritically projects onto the hunter-gatherer way of thinking a nature/society dichotomy which, as we have seen, is of Western provenance. According to this view, nature – which the people make no attempt to control or modify – is seen to go its own way, subject to ups and downs regardless of human actions or dispositions

towards it. If it yields, or fails to yield, this is not because it has the hunter-gatherer in mind. And the hunter-gatherer has to assume that it *will* yield, since life itself is predicated on this expectation. The alternative, in Luhmann's words, 'is to withdraw expectations without having anything with which to replace them' (1988: 97).

Now all of us have to make these kinds of assumptions all the time: they are what enable us to get by in a world full of unforeseen and unconsidered dangers. The world may stop revolving or be knocked off course by a meteoric collision, but we have to assume that it will not, and for the most part the possibility never enters our heads. Likewise, according to Sahlins, hunter-gatherers assume the providence of nature and do not consider the possibility of starvation. It is this attitude that I denote by the concept of confidence. And the crucial aspect of confidence to which I wish to draw attention is that it presupposes no engagement, no active involvement on our part, with the potential sources of danger in the world, so that when trouble does strike it is attributed to forces *external* to the field of our own relationships, forces which just happen to set the 'outside world', under its own momentum, on a collision course with our expectations. But with the attitude that I denote by the concept of trust, it is quite otherwise. Trust presupposes an active, prior engagement with the agencies and entities of the environment on which we depend; it is an inherent quality of our relationships towards them. And my contention is that in this strict sense, trust rather than confidence characterises the attitude of hunters and gatherers towards their non-human environment, just as it characterises their attitude towards one another.

The animals in the environment of the hunter do not simply go their own way, but are supposed to act with the hunter in mind. They are not just 'there' for the hunter to find and take as he will; rather they *present themselves* to him. The encounter, then, is a moment in the unfolding of a continuing – even lifelong – relationship between the hunter and the animal kind (of which every particular individual encountered is a specific instance). The hunter hopes that by being good to animals, they in turn will be good to him.[6] But by the same token, the animals have the power to withhold if any attempt is made to coerce what they are not, of their own volition, prepared to provide. For coercion, the attempt to extract by force, represents a betrayal of the trust that underwrites the willingness to give. Animals thus maltreated will desert the hunter, or even cause him ill fortune. This is the reason why, as I mentioned above, the encounter between hunter and prey is conceived as basically non-violent. It is also the reason why hunters aim to take only what is revealed to them and do not press for more. To describe this orientation as 'opportunism' is misleading, for it is not a matter of taking what you can get but of accepting what is given. The same applies in the context of intra-community sharing: one may indeed ask for things that others have, but not for more. 'Practically, would-be-recipients request what they *see* in the possession of others and do not request them to produce what they do not appear to have' (Bird-David 1992a: 30).

By regarding the relation between hunters and their prey as one of trust, we can also resolve the problem inherent in Woodburn's distinction between immediate-return and delayed-return systems. Woodburn was concerned to discover the basis for the pronounced emphasis on personal autonomy in many hunter-gatherer societies, and he put it down to the lack of specific commitments and enduring relationships in an immediate-return economy. Yet we find that at least among hunters, people are enmeshed in highly particularistic and intimate ties with both human and non-human others. Contrary to expectations, however, their sense of autonomy is not compromised. Woodburn's error, as we can now see, was to assume that dependency on specific other people entails loss

of autonomy. This is not necessarily so, for it is precisely in relations of trust that autonomy is retained *despite* dependency. But trust, as I have noted, inevitably entails risk, and this is as much the case in hunters' relations with animals as it is within the human community. Thus, of the 'other-than-human' persons that inhabit the world of the Ojibwa, Hallowell observes – taking up the perspective of an Ojibwa subject – that

> I cannot always predict exactly how they will act, although most of the time their behaviour meets my expectations . . . They may be friendly and help me when I need them but, at the same time, I have to be prepared for hostile acts, too. I must be cautious in my relations with other 'persons' because appearances may be deceptive.
>
> (1960: 43)

That is why hunters attach such enormous importance to knowledge and its acquisition. This is not knowledge in the natural scientific sense, of things and how they work. It is rather as we would speak of it in relation to persons: to 'know' someone is to be in a position to approach him directly with a fair expectation of the likely response, to be familiar with that person's past history and sensible to his tastes, moods and idiosyncrasies. You get to know other human persons by sharing with them, that is by experiencing their companionship. And if you are a hunter, you get to know animals by hunting. As I shall show in Chapter Sixteen, the weapons of the hunter, far from being instruments of control or manipulation, serve this purpose of acquiring knowledge. Through them, the hunter does not transform the world, rather the world opens itself up to him. Like words, the hunter's tools are caught up in chains of personal (not mechanical) causation, serving to reveal the otherwise hidden intentions of non-human agents in a world where, recalling Feit's remark concerning the Cree, it is 'always appropriate to ask "who did it?" and "why?" rather than "how does that work?"' (1973: 116). In short, the hunter does not seek, and fail to achieve, control over animals; he seeks revelation. Robin Ridington has put the point concisely in his observation that hunter-gatherers, 'instead of attempting to control nature . . . concentrate on controlling their relationship with it' (1982: 471).

Domination

It is quite otherwise with pastoralists.[7] Like hunters, they depend on animals, and their relationship with these animals may similarly be characterised by a quality of attentive, and at times even benevolent regard. Herdsmen do indeed care for their animals, but it is care of a quite different kind from that extended by hunters. For one thing, the animals are presumed to lack the capacity to reciprocate. In the world of the hunter, animals, too, are supposed to care, to the extent of laying down their lives for humans by allowing themselves to be taken. They retain, however, full control over their own destiny. Under pastoralism, that control has been relinquished to humans. It is the herdsman who takes life-or-death decisions concerning what are now 'his' animals, and who controls every other aspect of their welfare, acting as he does as both protector, guardian and executioner. He sacrifices them; they do not sacrifice themselves to him (Ingold 1986a: 272–3). They are cared for, but they are not themselves empowered to care. Like dependants in the household of a patriarch, their status is that of jural minors, subject to the authority of their human master (Ingold 1980: 96). In short, the relationship of pastoral care, quite unlike that of the hunter towards animals, is founded on a principle not of trust but of domination.[8]

These principles of relationship are mutually exclusive: to secure the compliance of the other by imposing one's will, whether by force or by more subtle forms of manipulation, is – as we have seen – an abrogation of trust, entailing as it does the denial rather than the recognition of the autonomy of the other on whom one depends. The very means by which the herdsman aims to secure access to animals would, for the hunter, involve a betrayal which would have the opposite effect of causing them to desert. The instruments of herding, quite unlike those of hunting, are of control rather than revelation: they include the whip, spur, harness and hobble, all of them designed either to restrict or to induce movement through the infliction of physical force, and sometimes acute pain (I return to these in Chapter Fifteen, pp. 306–8). Should we conclude, then, that while the concept of wildness is clearly inapplicable to describe the hunter's perception of animals with whom he enjoys a relation of trust and familiarity, the opposite concept of domestication – with its connotations of mastery and control – is perfectly apt to describe the pastoralist's relation with the animals in his herd?

The answer depends on precisely how we understand the nature of this mastery and control, and this, in turn, hinges on the significance we attach to the notion of physical force. Consider the slave-driver, whip in hand, compelling his slaves to toil through the brute infliction of severe pain. Clearly the autonomy of the slave in this situation to act according to his own volition is very seriously compromised. Does this mean that the slave responds in a purely mechanical way to the stroke of the whip? Far from it. For when we speak of the application of force in this kind of situation, we impute to the recipient powers of resistance – powers which the infliction of pain is specifically intended to overwhelm. That is to say, the use of force is predicated on the assumption that the slave is a being with the capacity to act and suffer, and in that sense a person. And when we say that the master causes the slave to work, the causation is personal, not mechanical: it lies in the *social* relation between master and slave, which is clearly one of domination. In fact, the original connotation of 'force' was precisely that of action intentionally directed against the resistance of another sentient being, and the metaphorical extension from the domain of interpersonal relations to that of the movements of inanimate and insentient things, like planets or billiard balls, is both relatively recent and highly specialised (see Walter 1969: 40 for a discussion of this point).

Now if by the notion of domestication is implied a kind of mastery and control similar to that entailed in slavery, then this notion might indeed be applicable to describe the pastoralist's relation with the animals in his herd. Richard Tapper argues, along precisely these lines, that where 'individual animals are taken out of their natural species community and subjugated to provide labour for the human production process, . . . their feeding under the control of their human masters', one may reasonably describe the 'human–animal relations of production' thereby established as 'slave-based' (Tapper 1988: 52–3). In those societies of the ancient world in which slavery was the dominant relation of production, the parallel between the domestic animal and the slave appears to have been self-evident. The Romans, for example, classified slaves and cattle, respectively, as *instrumentum genus vocale* and *instrumentum genus semi-vocale* (Tapper 1988: 59 fn. 3), while Vedic texts, according to Benveniste (1969: 48), have a term *pasu* for animate possessions that admits two varieties, quadrupedal (referring to domestic animals) and bipedal (referring to human slaves). Perhaps the most extraordinary piece of evidence comes from the work of the Japanese scholar, K. Maekawa, on the temple economy of Sumeria in the third millennium BC. From his analysis of Sumerian texts, Maekawa shows that the temple-state of Lagash maintained one population of captured female slaves to work as

weavers, and another population of cattle for the supply of milk. In each population, female offspring were retained to secure its continuation, while male offspring were castrated and put to work: the men in hauling boats up-river, the oxen in pulling the plough (cited in Tani 1996: 404–5).

In a remarkable extension of the argument for the parallel between the domestic animal and the slave, Yutaka Tani has drawn attention to a technique for managing pastoral herds of sheep or goats that is widely distributed in the Mediterranean and Middle East. A selected male animal is castrated and trained to respond to the vocal commands of the shepherd. On rejoining the herd, this animal, known as a 'guide-whether', acts as an inter-mediary between the shepherd (the dominator) and his flock (the dominated). For while obedient to its master, the whether also sets an example, in its behaviour, which is followed by all the other animals in the flock. Now barring a small number of males kept for breeding purposes, most of these animals are female. The position of the whether, a castrated male charged with the guidance of a herd of females, is thus functionally anal-ogous to the position of the human eunuch, in the court of the emperor, charged with guarding the females of his harem. The reliability and trustworthiness of the eunuch, like that of the guide-whether, derives from his exclusion from the reproductive process. But despite his high rank, the eunuch remains a slave, wholly dependent on imperial favour for his position. Noting the similarity between the techniques of management employed, respectively, by the shepherd to control his flock and by the emperor to control his harem, Tani wonders whether the latter might be derived from the former (or, less probably, vice versa). The idea may seem far-fetched, and the historical evidence, as Tani admits, is inconclusive. Yet it seems more than coincidental that the technique of using the guide-whether is distributed 'in the same areas of the Mediterranean and Middle East as where the political institution of the eunuch first appeared and from where it diffused' (Tani 1996: 388–91, 403).

However obvious the parallel may have seemed, to people of the ancient world, between the domination and control of slaves and of pastoral herds, it is an idea that is deeply alien to modern Western thought. For viewing both kinds of relationship, with slaves and with livestock, through the lens of a dichotomy between humanity and nature, we are convinced that the master–slave relationship, occurring between human beings, exists on the level of society, whereas domestication amounts to a social appropriation of – or intervention in – the separate domain of nature, within which animal existence is fully contained. In a revealing comment, Marx argued that relations of domination, such as obtain between master and slave, cannot obtain between humans and domestic animals, because the latter lack the power of intentional agency: 'Beings without will, such as animals, may indeed render services, but their owner is not thereby lord and master' (1964: 102; see Ingold 1980: 88). Domination and domestication are here distinguished, on the premise that the one is a form of social control exercised over subject-persons, and the other a form of mechanical control exercised over object-things. But this is not, to my knowledge, a distinction that any pastoral people make themselves. They may rank animals hierarchically below humans, as in ancient society slaves were ranked hierarchi-cally below freemen, but they are not assigned to a separate domain of being. And although the relations pastoralists establish with animals are quite different from those established by hunters, they rest, at a more fundamental level, on the same premise, namely that animals are, like human beings, endowed with powers of sentience and autonomous action which have either to be respected, as in hunting, or overcome through superior force, as in pastoralism.

To sum up: my contention is that the transition in human–animal relations that in Western scholarly literature is described as the domestication of creatures that were once wild, should rather be described as a transition from trust to domination. I have suggested that the negative stereotype of the hunter's relation to his prey, marked by the absence of control, be replaced by a more positive characterisation as a certain mode of engagement. But I have also shown that the emergence of pastoralism does not depend, as orthodox definitions of domestication imply, upon humans' achieving a state of being that takes them above and beyond the world in which all other creatures live. Thus the transition from trust to domination is not to be understood as a movement from engagement to disengagement, from a situation where humans and animals are co-participants in the same world to one in which they hive off into their own separate worlds of society and nature. Quite to the contrary, the transition involves a *change in the terms of engagement*. Whether the regime be one of hunting or of pastoralism, humans and animals relate to one another not in mind or body alone but as undivided centres of intention and action, as whole beings. Only with the advent of industrial livestock management have animals been reduced, in practice and not just in theory, to the mere 'objects' that theorists of the Western tradition (who, barring the occasional pet, had little or no contact with animals in the course of their working lives) had always supposed them to be (Tapper 1988: 52–7). Indeed this objectification of animals, having reached its peak in the agro-pastoral industry, is as far removed from the relations of domination entailed in traditional pastoral care as it is from the relations of trust entailed in hunting.

Moreover, as alternative modes of relationship, neither trust nor domination is in any sense more or less advanced than the other. It is important, in particular, to guard against the tendency to think of relations based on trust as morally, or intrinsically 'good', and of those based on domination as intrinsically 'bad'. They are simply different. Trust, as I have shown, is a relation fraught with risk, tension and ambiguity. It is well to remember Hallowell's point, apropos Ojibwa ontology, that 'appearances my be deceptive' (1960: 43). The underside of trust, as Hallowell shows so clearly, is chronic anxiety and suspicion. Thus to argue that hunter-gatherer relations with the environment are based on a principle of trust is not to present yet another version of the arcadian vision of life in harmony with nature. Nor, by the same token, should the movement from trust to domination be regarded as one that replaced harmony by discord, or that set humanity on the path of its irrevocable alienation from nature. When hunters became pastoralists they began to relate to animals, and to one another, in different ways. But they were not taking the first steps on the road to modernity.

CONCLUSION

Writing of Koyukon hunters of Alaska, Nelson remarks that, for them, 'the conceptual distance between humanity and nature is narrow' (1983: 240). On the evidence of his own account, and many others, it would be more true to say that there is no conceptual distance at all, or rather that what *we* distinguish as humanity and nature merge, for them, into a single field of relationships. And indeed, we find nothing corresponding to the Western concept of nature in hunter-gatherer representations, for they see no essential difference between the ways one relates to humans and to non-human constituents of the environment. We have seen how both sharing (among humans) and hunting (of animals by humans) rest on the same principle of trust, and how the sense in which hunters claim to know and care for animals is identical to the sense in which they know and care for

other human beings. One could make the same argument for pastoralism: I have shown elsewhere, in the case of northern Eurasian reindeer herdsmen, how the transition from hunting to pastoralism led to the emergence, in place of egalitarian relations of sharing, of relations of dominance and subordination between herding leaders and their assistants (Ingold 1980: 165–9). Evidently a transition in the quality of relationship, from trust to domination, affects relations not only between humans and non-human animals, but also, and equally, among human beings themselves. Hallowell's observation that in the world of the Ojibwa, 'vital social relations transcend those which are maintained with human beings' (1960: 43) could apply just as well to other hunting peoples, and indeed to pastoralists as well.

This observation, however, plays havoc with the established Western dichotomies between animals and society, or nature and humanity. The distinction between the human and the non-human no longer marks the outer limits of the social world, as against that of nature, but rather maps a domain within it whose boundary is both permeable and easily crossed. It comes as no surprise, then, that anthropology, as an intellectual product of the Western tradition, has sought to contain the damage by relativising the indigenous view and thereby neutralising the challenge it presents to our own suppositions. Thus we are told that the hunter-gatherer view is just another cultural construction of reality. When hunters use terms drawn from the domain of human interaction to describe their relations with animals, they are said to be indulging in metaphor (Bird-David 1992a). But to claim that what is literally true of relations among humans (for example, that they share), is only figuratively true of relations with animals, is to reproduce the very dichotomy between animals and society that the indigenous view purports to reject. We tell ourselves reassuringly that this view the hunters have, of sharing with animals as they would with people, however appealing it might be, does not correspond with what actually happens. For nature, we say, does not *really* share with man.[9] When hunters assert the contrary it is because the image of sharing is so deeply ingrained in their thought that they can no longer tell the metaphor from the reality. But *we* can, and we insist – on these grounds – that the hunters have got it wrong.

This strikes me as profoundly arrogant. It is to accord priority to the Western metaphysics of the alienation of humanity from nature, and to use *our* disengagement as the standard against which to judge *their* engagement. Faced with an ecological crisis whose roots lie in this disengagement, in the separation of human agency and social responsibility from the sphere of our direct involvement with the non-human environment, it surely behoves us to reverse this order of priority. I began with the point that while both humans and animals have histories of their mutual relations, only humans narrate such histories. But to construct a narrative, one must already dwell in the world and, in the dwelling, enter into relationships with its constituents, both human and non-human. I am suggesting that we rewrite the history of human–animal relations, taking this condition of active engagement, of being-in-the-world, as our starting point. We might speak of it as a history of human *concern* with animals, insofar as this notion conveys a caring, attentive regard, a 'being with'. And I am suggesting that those who are 'with' animals in their day-to-day lives, most notably hunters and herdsmen, can offer us some of the best possible indications of how we might proceed.

Chapter Five

Making things, growing plants, raising animals and bringing up children

> We have . . . large and various orchards and gardens . . . And we make (by art) in the same orchards and gardens trees and flowers to come earlier or later than their seasons, and to come up and bear more speedily than by their natural course they do. We make them also by art greater much than their nature, and their fruit greater and sweeter and of differing taste, smell, colour and figure, from their nature . . . We have also parks and inclosures of all sorts of beasts and birds . . . By art likewise we make them greater or taller than their kind is, and contrariwise dwarf them, and stay their growth; we make them more fruitful and bearing than their kind is, and contrariwise barren and not generative. Also we make them differ in colour, shape, activity, many ways.

So wrote Francis Bacon in 1624, outlining his Utopian vision of the *New Atlantis*, a society dedicated to the mastery of nature through rigorous application of the principles of rational science (Bacon 1965: 449–50). In this society every kind of living thing, both animal and vegetable, can be *made by art* so that it better serves human purposes. In what follows I aim to show how this notion of making has come to rest at the heart of what we mean by production, in relation not only to the manufacture of artefacts but also, and more especially, to the breeding – or 'artificial selection' – of plants and animals. The idea of production as making, I argue, is embedded in a grand narrative of the human transcendence of nature, in which the domestication of plants and animals figures as the counterpart of the self-domestication of humanity in the process of civilisation. I go on to consider how people who actually live by gardening, tilling the soil or keeping live-stock understand the nature of their activity, drawing on examples from South America, Melanesia and West Africa. Taking these understandings as a starting point, I shall then take a fresh look at what it means to cultivate plants and to husband animals. My conclu-sion is that the work of the farmer or herdsman does not *make* crops or livestock, but rather serves to set up certain conditions of development within which plants and animals take on their particular forms and behavioural dispositions. We are dealing, in a word, with processes of *growth*.

THE HUMAN TRANSFORMATION OF NATURE

According to the received categories of archaeological and anthropological thought, there are basically just two ways of procuring a livelihood from the natural environment, conventionally denoted by the terms *collection* and *production*. The distinction between them was first coined by Friedrich Engels. In a note penned in 1875, Engels pointed to production as the most fundamental criterion of what he saw as a kind of 'mastery'

of the environment that was distinctively human: 'The most that the animal can achieve is to *collect*; man produces, he prepares the means of life ... which without him nature would not have produced. This makes impossible any unqualified transference of the laws of life in animal society to human society' (1934: 308). The essence of production, for Engels, lay in the deliberate planning of activity by intentional and selfconscious agents. Animals, through their activities, might exert lasting and quite radical effects on their environments, but these effects are by and large unintended: the non-human animal, Engels thought, did not labour in its surroundings *in order* to change them; it had no conception of its task. The human, by contrast, always has an end in mind.

Curiously, however, whenever Engels turned to consider concrete examples of human mastery in production, he drew them exclusively from the activities of agriculture and pastoralism, through which plants, animals and the landscape itself had been demonstrably transformed through human design (1934: 34, 178–9). Opposing the foraging behaviour of non-human species to the human husbandry of plants and animals, Engels left a gap that could only be filled by calling into being a special category of humans known to him and his contemporaries as 'savages'. As a hunter of animals and a gatherer of plants, the savage had, as it were, come down from the trees but had not yet left the woods: suspended in limbo between evolution and history, he was a human being who had so far failed to realise the potential afforded by his unique constitution. Ever since, the humanity of hunter-gatherers has been somehow in question. They may be members of the species, *Homo sapiens*, but their form of life is such as to put them on a par with other animal kinds which also derive their subsistence by collecting whatever is 'to hand' in the environment. As the archaeologist Robert Braidwood wrote in 1957, 'a man who spends his whole life following animals just to kill them to eat, or moving from one berry patch to another, is really living just like an animal himself' (Braidwood 1957: 22).

This latent ambiguity also allowed the archaeologist, V. Gordon Childe, to take up the distinction between collection and production – in terms virtually identical to those proposed by Engels – to draw a line not between humans and animals, but between 'neolithic' people and their successors on the one hand, and 'palaeolithic' hunters and gatherers on the other. In crossing this line, the ancestors of present-day farmers, herdsmen and urban dwellers were alleged to have set in motion a revolution in the arts of subsistence without parallel in the history of life. Ushered in by the invention of the science of selective breeding, it was a revolution that turned people, according to Childe, into 'active partners with nature instead of parasites on nature' (1942: 55). Though contemporary authors might phrase the distinction somewhat differently, the notion of food-production as the singular achievement of human agriculturalists and pastoralists has become part of the stock-in-trade of modern prehistory. And understanding the origins of food-production has become as central a preoccupation for prehistorians as has understanding the origins of humankind for palaeoanthropologists: where the latter seek the evolutionary origins of human beings *within* nature, the former seek the decisive moment at which humanity *transcended* nature, and was set on the path of history.

Underlying the collection/production distinction, then, is a master narrative about how human beings, through their mental and bodily labour, have progressively raised themselves above the purely natural level of existence to which all other animals are confined, and in so doing have built themselves a history of civilisation. Through their transformations of nature, according to this narrative, humans have also transformed themselves. It is a fact about human beings, states Maurice Godelier, that alone among animals, they '*produce society in order to live*' – and in so doing, 'create history' (1986: 1, original

emphases). By this he means that the designs and purposes of human action upon the natural environment – action that yields a return in the form of the wherewithal for subsistence – have their source in the domain of social relations, a domain of mental realities ('representations, judgements, principles of thought') that stands over and above the sheer materiality of nature (1986: 10–11).

Godelier goes on to distinguish five 'kinds of materiality', depending upon the manner and extent to which human beings are implicated in their formation. First is that part of nature which is wholly untouched by human activity; secondly there is the part that has been changed on account of the presence of humans, but indirectly and unintentionally; the third is the part that has been intentionally transformed by human beings and that depends upon their attention and energy for its reproduction; the fourth part comprises materials that have been fashioned into instruments such as tools and weapons, and the fifth may be identified with what we would conventionally call the 'built environment' – houses, shelters, monuments, and the like (Godelier 1986: 4–5). In this classification the critical division falls between the second and third kinds, for it is also taken to mark the distinction between the wild and the domestic. The third part of nature is taken to consist, primarily, of domesticated plants and animals, whereas the biotic components of the first and second parts are either wild or, at most, in a condition of pre-domestication. Moreover Godelier points to the domestication of plants and animals as a paradigmatic instance of the transforming action of humanity upon nature. This leaves us, however, with two unresolved problems.

The first concerns the status of hunters and gatherers who have sought not to transform their environments but rather to conserve them in a form that remains, so far as possible, unscarred by human activity. If, as Godelier claims, 'human beings have a history because they transform nature' (1986: 1), are we to conclude that humans who do not transform nature lack history? For his own part, Godelier resists this conclusion: 'I cannot see any theoretical reason to consider the forms of life and thought characteristic of hunters, gatherers and fishers as more natural than those of the agriculturalists and stockbreeders who succeeded them' (1986: 12). The activities of hunter-gatherers, he asserts, are like those of all human beings at all times, and unlike those of all non-human animals, in that they are prompted by mental representations that have their source in the intersubjective domain of society. Yet apart from the construction of tools and shelters (corresponding to the fourth and fifth kinds of materiality), these representations are not materialised in the physical substrate of nature. Hunter-gatherers have a history, but theirs is a history that is written neither in the pages of documents nor upon the surface of the land. It is inscribed exclusively upon the plane of mental rather than material reality. Overturning the classical conception of hunter-gatherers as arch-representatives of humanity in the state of nature, Godelier reaches the rather paradoxical conclusion that it is in their societies that the boundary between the mental and the material, between culture and nature, is most clearcut. The more that the material world is subordinated to the ends of art, the more the world of ideas is rendered in physical form, the less clearcut the nature/culture distinction appears to be (1986: 4).

The second problem is one to which Godelier alludes in a footnote, but fails to take further. It is that for most non-Western people, 'the idea of a transformation of nature by human beings has no meaning' (1986: 2, fn. 1). Thus the peoples of the past who were initially responsible for domesticating plants and animals must have had quite different ideas about what they were doing. In the next section I shall present a range of comparable ideas drawn from the ethnography of contemporary non-Western societies.

The point to stress at this juncture is that the idea of history as consisting in the human transformation of nature, like the ideas of nature itself and of society as an entity counterposed to nature, has a history of its own in the Western world. By tracing this history back to its roots we may find that it has grown out of a set of understandings very different from those familiar to us today, yet much closer to the apparently exotic cosmologies of non-Western 'others'.

It is beyond the scope of this chapter to document the history of Western thinking about humanity and nature (Glacken's [1967] massive treatise on the subject remains unsurpassed). Suffice it to note that the essence of the kind of thought we call 'Western' is that it is founded in a claim to the subordination of nature by human powers of reason. Entailed in this claim is a notion of making things as an imprinting of prior conceptual design upon a raw material substrate. Human reason is supposed to provide the form, nature the substance in which it is realised. We have already encountered this idea of making in the writings of Bacon, but more than two hundred years later it served as the fulcrum of Marx's theory of value, according to which it was the work of shaping up the material from its raw to its final state that bestowed value on what was already 'given' in nature. It made no difference, in principle, whether that work was represented by the labour of the artisan, in the manufacture of equipment, or by that of the farmer or stockbreeder, in the husbandry of plants and animals. Both were conceived as instances of productive making – the human transformation of nature.

Yet in arriving at his theory of value, Marx turned on its head an idea of even greater antiquity, though one whose systematic elaboration had to await the writings of the French Physiocrats, Quesnay and Turgot, in the eighteenth century. For these writers too, the role of the artisan was to imprint a rational design upon material supplied by nature. But in doing so, he created no new value. To the contrary, his work was understood to involve nothing more than a rearrangement of what nature had already brought into existence. The real source of wealth, according to Physiocracy, was the land, and lay in its inherent fertility. And for this reason, the activities of those who worked the land, in growing crops and raising animals, were understood to be fundamentally different in character from the activities of those whose tasks lay in the field of manufacture.

In an elegant analysis, Stephen Gudeman (1986: 80–4) has shown how the economic doctrines of Physiocracy were closely modelled on the theory of perception and cognition proposed some seventy years previously by John Locke. In Locke's economy of knowledge, the natural world is a source of raw sensations impinging upon the receptor organs of the passive human observer. The mind then operates on these received sensory data, separating and combining them to form complex ideas. In just the same way, according to the Physiocrats, the land furnishes its inhabitants with basic raw materials, to which human reason adds form and meaning. As Gudeman puts it, 'in this "intellectual" economics, agriculture is to artisanship as sensation was to mental operation' (1986: 83). The role of the farmer is to receive the substantive yield of the land, that of the artisan is to deliver the formal designs of humanity. Where the farmer's work is productive, in that it results in an influx of wealth to the human community, it is nevertheless passive since the creative agency in bringing forth this wealth was attributed to the land itself and, behind that, to divine intervention. Conversely the artisan's work is non-productive, since it adds nothing to human wealth, but is nevertheless active since it is impelled by reason (Gudeman 1986: 87).

In this view, although it would still be fair to describe the act of making things as a human transformation of nature, such making is not the equivalent but the very *opposite*

of production, just as artisanship is the opposite of agriculture. Production is a process of growing, not making. The farmer, and for that matter the raiser of livestock, submits to a productive dynamic that is immanent in the natural world itself, rather than converting nature into an instrument to his own purpose. Far from 'impressing the stamp of their will upon the earth', to adopt Engels's imperialistic phrase (1934: 179), those who toil on the land – in clearing fields, turning the soil, sowing, weeding, reaping, pasturing their flocks and herds, or feeding animals in their stalls – are assisting in the reproduction of nature, and derivatively of their own kind.

In classical Greece, too, agriculture and artisanship were clearly opposed, belonging – as Vernant remarks (1983: 253) – 'to two different fields of experience which are to a large extent mutually exclusive'. The contrast between growing things and making things was delightfully phrased by the Sophist author Antiphon, writing in the fifth century BC, who invites us to imagine an old wooden bed, buried in the ground, taking root and sprouting green shoots. What comes up, however, is not a new bed, but fresh wood! Beds are made, but wood grows (Vernant 1983: 260). As a grower of crops rather than a maker of artefacts, the farmer was not seen to act upon nature, let alone to transform it to human ends. Work on the land was more a matter of falling into line with an overarching order, at once natural and divinely ordained, within which the finalities of human existence were themselves encompassed. Even were it technically possible to transform nature, the very idea would have been regarded as an impiety (Vernant 1983: 254).

If there is a certain parallel here with the doctrines of Physiocracy, despite the immense lapse of time, it is doubtless because both classical Greek and eighteenth century Physiocratic authors were able to draw on a fund of practical experience in working on the land. When it came to farming, they knew what they were talking about. But with regard to artisanship, their respective notions could not have been more different. For according to classical Greek writers, the forms which the artisan realised in his material issued not from the human mind, as constructs of a rational intelligence, but were themselves inscribed in the order of nature. Thus the idea of making as an imposition of rational design upon raw material would have been entirely alien to Greek thought. 'The artisan is not in command of nature; he submits to the requirements of the form. His function and his excellence is . . . to obey' (Vernant 1983: 294). This, of course, is the precise inverse of Godelier's assertion that in the husbandry of plants and animals, in making tools and constructing buildings – that is, in the production of the third, fourth and fifth kinds of materiality – it is nature that submits to the requirements of human form. The idea that production consists in action *upon* nature, issuing from a superior source in society, is an essentially modern one.

INDIGENOUS UNDERSTANDING: FOUR ETHNOGRAPHIC EXAMPLES

Our next step is to turn to consider some of the ways in which contemporary non-Western people understand their relations with cultivated plants and domestic animals. In what follows I shall present four ethnographic examples. The first is taken from Philippe Descola's (1994) study of the Achuar Indians of the Upper Amazon, the second draws on Marilyn Strathern's (1980) work on the people of the Mount Hagen region of the Papua New Guinea Highlands, and the third comes from a study by Walter van Beek and Pieteke Banga (1992) of the Dogon of Mali, in West Africa. For my fourth and final example I return to South America, and to the study by Stephen Gudeman and Alberto Rivera (1990) of the peasant farmers of Boyacá, in Colombia.

The Achuar of the Upper Amazon

The Achuar cultivate a great variety of plant species, of which the most ubiquitous is manioc, in gardens that have been cleared through a 'slash-and-burn' technique from primary forest. The focus of domestic life is the house, which stands at the centre of its garden, surrounded in turn by a vast expanse of forest. Though a man is expected to prepare a garden plot for each of his wives, the cultivation, maintenance and harvesting of plots is exclusively women's work. All members of the household regularly participate in gathering activities, which are concentrated in familiar areas of the forest within close reach of the garden. Beyond that is the zone of hunting, a risky space in which men dominate, and to which women venture only when accompanied by their husbands.

Gathering, for the Achuar, is a relaxed affair – an occasion for a pleasant day out. But hunting is a quite different matter. Men's relations with the animals they hunt are modelled on the human relation of affinity: like human in-laws, the creatures of the forest are inclined to be touchy, and their feelings have continually to be assuaged with liberal doses of seductive charm. Above all, it is necessary to keep on the right side of the 'game mothers', the guardian spirits of the animals, who exercise the same kind of control over their charges as do human mothers over their own children and domestic animals (Descola 1994: 257). Motherhood, however, also extends to a woman's relations with the plants she grows in her garden. She has, as it were, two sets of offspring, the plants in her garden and the children in her home, and since the two are in competition for the nurturance she can provide, relations between them are far from harmonious. Manioc, for example, is attributed with the power to suck the blood of human infants. Thus despite its peaceful appearance, the garden is as full of menace as is the surrounding forest (1994: 206).

Applying orthodox concepts of anthropological analysis, we might be inclined to oppose the forest and the garden along the lines of a distinction between the wild and the domesticated, as though the edge of the woods also marked the outer limits of the human socialisation of nature, and the point of transition at which production gives way to collection. But this, as Descola shows, would be profoundly at odds with Achuar understandings. For in the construction and maintenance of their gardens, the Achuar do not see themselves as engaged in a project of domesticating the pristine world of the forest; indeed the colonial image of the conquest of nature is entirely foreign to their way of thinking. For them, the forest is itself a huge garden, albeit an untidy one, and the relations between its constituents are governed by the same principles of domesticity that structure the human household, yet on a superhuman scale. The tension between garden plants and children mirrors, on a reduced scale, the tension between forest creatures and human hunters; likewise a woman's care for her crops and domestic animals is writ large in the care of the 'game mothers' for the species in their charge. In short, the Achuar garden figures as a microcosm of the forest: 'it is not so much the cultural transformation of a portion of wild space as the cultural homology in the human order of a cultural reality of the same standing in the superhuman order'. Human society is a scaled-down version of the society of nature, the garden plot 'temporarily realizes the virtualities of a homely wilderness' (Descola 1994: 220).

The people of Mount Hagen

The people of the Mount Hagen region of Papua New Guinea (henceforth 'Hageners') grow crops – especially taro, yams and sweet potato – in forest clearings; they also raise

pigs. They have a word, *mbo*, for the activity of planting, which is also used for things that are planted such as cuttings pushed into the ground. By extension it can refer to any other point of growth within the general field of human relations: thus a breeding pig can be *mbo* in respect of the herd it will engender, and people can be *mbo* in respect of their placement in clan territory. The antithesis of *mbo* is *rømi*. This latter term is used for things or powers that lie beyond the reach of human nurture. The principal cultivated tubers have their wild counterparts, and these are *rømi*, as are wild pigs and other forest creatures. There are also *rømi* spirits who tend these wild plants and animals, just as people tend their gardens and pigs (Strathern 1980: 192). Indeed at first glance, the terms *mbo* and *rømi* seem to have their more or less exact equivalent in our conventional notions of 'wild' and 'domestic' respectively.

Completely absent from the Hagen conception, however, is the notion of a domestic environment 'carved out' from wild nature. *Mbo* does not refer to an enclosed space of settlement, as opposed to the surrounding bush or forest. Hageners do not seek to subjugate or colonise the wilderness; while the spirit masters of forest creatures have their spheres of influence as humans have theirs, the aim is 'not to subdue but to come to terms with them' (1980: 194). *Rømi* is simply that which lies outside the limits of human care and sociability. Significantly, while the opposed term *mbo* takes its primary meaning from the act of planting, it is not used for any other stage of the horticultural process, nor for garden land itself (1980: 200). In planting one does not transform nature, in the sense of imposing a rational order upon a given materiality. Rather, one places a cutting in the ground so that it may take root and grow.[1] As its roots extend into the soil, so the plant draws nourishment from its environment, gradually assuming its mature form.

Like the Achuar, Hageners draw a parallel between growing plants and growing children. The child, placed at birth within a field of nurture – as the plant is placed in the soil – steadily grows into maturity as a responsible, self-aware being, drawing sustenance from its relationships with others even as the latter, like the plant's roots, extend ever further outwards into the social environment (1980: 196). There is no sense, however, in which the child starts life as a thing of nature, to which a moral dimension of rules and values is added on through a process of socialisation. The child does not begin as *rømi*, and become *mbo*. It is *mbo* from the outset, by virtue of its planting within the field of human relationships. So too, in their cultivation of tubers and raising of pigs, Hageners do not impose a social order upon an environment consisting of 'nature in the raw'. They rather constitute, as inherently social, the very environment within which their plants and animals come into being, take root and grow to maturity.

The Dogon of Mali

Like many other African peoples (Morris 1995: 305–6), the Dogon draw a sharp contrast between the categories of *ana* (village) and *oru* (bush). In and around the village, people cultivate the staple crop of millet, and keep gardens of onions and tobacco. But they also depend on the bush in many ways. It is a source of firewood for cooking, brewing and firing pottery. Timber is needed, too, for building houses and granaries, and for fencing gardens. The bush also yields meat, relishes and treefruits, leaves for use as cattle fodder, and various medicinal herbs. However, the dependence of the village on the bush goes much deeper than this list of products would indicate. For in the Dogon view, the bush is nothing less than the source of life itself, and with it of all knowledge, wisdom, power and healing. But by the same token, it is greatly to be feared. It is a zone of movement

and flux, in which all the fixedness and certainties of village life are dissolved. Everything shifts and changes – even trees and rocks can walk from place to place. The many spirits that roam the bush can exchange body parts with living people, human hunters venturing there become like the animals they hunt, and as they do so their existence in the present is swallowed up in a temporal horizon that merges past and future, life and death (van Beek and Banga 1992: 67–8).

Dogon cosmology envisages a kind of entropic system in which the maintenance of the village depends upon a continual inflow of vital force from the bush, which is worn down and used up in the process. If the village is a place of stability, where things stay put and proper distinctions are maintained, it is also a place of stagnation. In an almost exact inversion of the modern Western notion of food production as the manifestation of human knowledge and power over nature, here it is nature – in the form of the bush – that holds ultimate power over human life, while the cultivated fields and gardens are sites of consumption rather than production, where vital force is *used up*. 'Knowledge dissipates . . . and power evaporates unless reinvigorated from the bush' (van Beek and Banga 1992: 69).

Peasant farmers of Boyacá

The rural folk of Colombia say that it is the earth that gives them their food; the role of human beings is to assist it in bringing forth its crops. As one farmer is reported to have put it: 'Man helps the land; the earth produces the fruit' (Gudeman and Rivera 1990: 25). Likewise hens give eggs, sheep give lambs and cows calves. Here, too, the farmer is called upon to assist in the animals' labour much as a midwife assists at a birth. But the ultimate source of the 'strength' or 'force' (*la fuerza*) that enables people to work, animals to reproduce and crops to grow lies in the land itself. The earth is conceived as a repository of strength created and sustained by God (1990: 18). Thus crops draw strength from the land, humans in turn gain strength by consuming their crops (or the produce of animals whose strength was drawn from their consumption of fodder), and expend that strength in work on the land that enables it to yield up yet more of its strength to the cycle.

Gudeman and Rivera detect in this folk model distinct echoes of eighteenth-century Physiocracy. Indeed they go so far as to suggest that it offers a window on much earlier notions current among farming peoples of the Old World, which still resonate through the practices of Colombian rural folk as well as through the texts of European political economists. The Physiocratic view that only the land yields value, which the farmer harnesses on behalf of society, has its counterpart in the Colombian farmers' notion that human life is powered by the strength of the earth. Both views, moreover, invert the modern Western conception that sees in the land not an active agent but an inert source of raw materials to be shaped up to a human design. Marx wrote of the earth as foremost among the instruments of labour, and ever since we have tended to think of production as a process wherein land is placed in the service of humanity (Meillassoux 1972). But Colombian rural folk place themselves in the service of the land. And they regard their capacity to work not as some inner aspect of their being, as in the Marxian concept of 'labour-power', but as God's gift of strength, bestowed through the land and its produce, and expended in their activity (Gudeman and Rivera 1990: 103–4).

MAKING THINGS, FINDING THINGS AND GROWING THINGS

Let me now return to the opposition with which I began, between production and collection. There is no doubt that the primary meaning of production in the age of manufacture is, to recall Bacon's phrase, 'making by art'. The term refers, in other words, to the construction of artificial objects by rearranging, assembling and transforming raw materials supplied by nature. And if the opposite of 'to produce' is 'to collect', then collection must mean picking up one's supplies, as it were 'ready-made', from the environment. But how can you 'make' a pig, a yam, or a crop of millet? And how, for that matter, can such things be made in advance?

I believe this modern emphasis on production as making accounts for the special significance that tends to be attached to the so-called 'artificial selection' of plants and animals as the key criterion for distinguishing food-production from food-collection, and hence for determining the point of transition from hunting and gathering to agriculture and pastoralism. The ability that Bacon dreamed of, literally to 'make' an animal or plant in any way we want it, is only now coming to be realised due to developments in biotechnology and genetic engineering. For farmers and herdsmen of the past, it has never been a realistic possibility. What they could do, however, was isolate a breeding population within which they could select individuals for reproduction according to their conformity to an ideal type. Just as the distinction between the artefact and the naturally given object (such as a living organism) depends on the notion that the former is built upon a design that is extrinsic rather than intrinsic to the material (Monod 1972: 21), so likewise artificial selection can only be distinguished from natural selection on the grounds that it is guided by a 'preconceived end', an ideal suspended within the collective representations of the human community. This is probably why the notion of domestication has come to be so closely tied up with that of breeding: it is the closest thing to constructing the forms of plants and animals to blueprints of human design. And this, in turn, is why prehistorians investigating the origins of food-production are inclined to look for evidence of the morphological divergence of the plant or animal species in question from its original 'wild' form, as proof that production was going on.

This procedure, however, generates its own anomalies. For in many parts of the world, both in the past and still today, people are apparently engaged in the husbandry of plants and animals that do not differ appreciably from their wild counterparts. Kept as pets in the houses of the Achuar are a range of 'domestic wild animals' – various primates, birds and peccary (Descola 1994: 90). The forests of Highland New Guinea are full of wild domestic pigs, as well as a variety of plants that also appear in cultivated swiddens. And the fields of neolithic villagers in Southwest Asia were sown with 'domesticated wild barley' (Jarman 1972). Now the source of these anomalies lies in the very dichotomy between collection and production. In terms of this dichotomy, human beings must *either* find their food ready-made in nature *or* make it themselves. Yet ask any farmer and he or she will say, with good cause, that the produce of the farm is no more made than it is found ready-made. It is *grown*. So our question must be as follows. Granted that by making things we mean the transformation of pre-existing raw materials, *what do we mean by growing things*? On the answer to this question must hinge the distinctions between gathering and cultivation, and between hunting and animal husbandry.

Two common themes to emerge from the ethnographic cases presented in the previous section point towards a solution. First, the work that people do, in such activities as field clearance, fencing, planting, weeding and so on, or in tending their livestock, does not

literally make plants and animals, but rather establishes the environmental conditions for their growth and development. They are 'mothered', nurtured, assisted – generally cosseted and helped along. Secondly, growing plants and raising animals are not so different, in principle, from bringing up children. Of course it is true that modern Western discourse, too, extends the notions of cultivation and breeding across human, animal and plant domains, referring in the human case to a refinement of taste and manners (Bouquet 1993: 189–90). Such refinement, however, is represented as a socially approved form of mastery over supposedly innate human impulses, and is the counterpart to the kind of mastery over the environment that is implied by the notion of domestication as the social appropriation of nature. When Achuar women compare their children to the plants in their gardens, or when Hageners use the language of planting for both children and pigs, they do not have this model of socialisation in mind. As Strathern puts it: 'the child grows into social maturity rather than being trained into it' (1980: 196). What each generation provides, whether in growing plants, raising animals or bringing up children, are precisely the developmental conditions under which 'growth to maturity' can occur.[2]

Where does this leave the distinctions between gathering and cultivation, and between hunting and animal husbandry? The difference surely lies in no more than this: the *relative scope of human involvement in establishing the conditions for growth*. This is not only a matter of degree rather than kind, it can also vary over time. Weeds can become cultigens, erstwhile domestic animals can turn feral. Moreover a crucial variable, I would suggest, lies in the temporal interlocking of the life-cycles of humans, animals and plants, and their relative durations. The lives of domestic animals tend to be somewhat shorter than those of human beings, but not so short as to be of a different order of magnitude. There is thus a sense in which people and their domestic animals grow older together, and in which their respective life-histories are intertwined as mutually constitutive strands of a single process. The lives of plants, by contrast, can range from the very short to the very long indeed, from a few months to many centuries.

Now as Laura Rival has pointed out, the planned intervention in and control over nature that we conventionally associate with the idea of domestication can only be envisaged in respect of plants 'whose growth is much faster relative to human growth and maturation processes' (Rival 1993: 648). It is as though humans could stand watch over the development of their crops without growing significantly older themselves. But the more slow-growing and long-lived the plant, the more artificial this assumption appears to be. In the case of the most enduring plants of all – such as certain large trees – the assumption becomes wholly untenable. Indeed for the most part, trees do not fit at all comfortably within the terms of the orthodox distinction between the wild and the domesticated, which may account for the curious fact that despite their manifest importance to people (as our Dogon example shows), they are all but absent from archaeological and anthropological discussions of the nature and origins of food production. Of an ancient tree that has presided over successive human generations it would seem more appropriate to say that it has played its part in the domestication *of* humans rather than having been domesticated *by* them.[3] In short, what is represented in the literature, under the rubric of domestication, as a transcendence and transformation of nature may be more a reflection of an increasing reliance on plants and animals that, by comparison with humans, are relatively fast-growing and short-lived.

I have suggested that regimes of plant and animal husbandry may best be distinguished in terms of the ways in which human beings involve themselves in establishing the conditions for growth. For example, in the cultivation of gardens, more is done to assist the

growth of plants than when they are gathered from the bush. To grasp this idea, all that is required is a simple switch of perspective: instead of thinking about plants as part of the natural environment for human beings, we have to think of humans and their activities as part of the environment for plants. But behind this switch there lies a point of much more fundamental significance. If human beings on the one hand, and plants and animals on the other, can be regarded alternately as components of each others' environments, then we can no longer think of humans as inhabiting a social world of their own, over and above the world of nature in which the lives of all other living things are contained. Rather, both humans and the animals and plants on which they depend for a livelihood must be regarded as fellow participants in the *same* world, a world that is at once social and natural. And the forms that all these creatures take are neither given in advance nor imposed from above, but emerge within the context of their mutual involvement in a single, continuous field of relationships.[4]

With this conclusion in mind, let me return to Godelier's five kinds of materiality, which were also distinguished according to the manner and extent of human involvement in their existence. In what way does Godelier's formulation differ from our own? The answer is that for Godelier, the formative role of humans lies in their capacity as beings who, to various degrees, act *upon*, intervene *in*, or do things *to*, a domain of nature that is external to their socially constituted selves. According to the argument I have presented, by contrast, human beings do not so much transform the material world as play their part, along with other creatures, in the world's transformation of itself (I return to this formulation in Chapter Eleven, pp. 200–1). In this view, nature is not a surface of materiality upon which human history is inscribed; rather history is the process wherein both people and their environments are continually bringing each other into being. This is one way of interpreting Marx's celebrated yet enigmatic remark that 'history itself is a *real* part of *natural history* – of nature developing into man' (Marx 1964: 143, original emphases). By the same token, it is also man developing into nature. Or in other words, human actions in the environment are better seen as incorporative than inscriptive, in the sense that they are built or enfolded into the forms of the landscape and its living inhabitants by way of their own processes of growth.

I have been concerned, in this chapter, to dissolve the conventional dichotomy between production and collection. In so doing, however, I seem to have ended up with another, equally intractable dichotomy, namely between making and growing. I have observed that in the tradition of Western thought, the idea of making – understood as the inscription of conceptual form upon material substance – has been extended from the manufacture of artefacts to the breeding of plants and animals, as exemplified in the passage from Bacon's *New Atlantis* with which I began. It has even been extended to the raising of children – insofar as this is regarded as a process of socialisation whereby approved norms and values are superimposed upon the raw material of new-born human infants. In every case it is supposed that a design or representation that has its source in the domain of society is imprinted upon the substrate of external nature. In arguing against this view, I have suggested that bringing up children or raising livestock, just as much as the cultivation of crops, is a process in which plants, animals or people are not so much made as grown, and in which surrounding human beings play a greater or lesser part in establishing the conditions of nurture.

I have but one further point to make in conclusion. The orthodox Western account, as we have seen, extends the idea of making from the domain of inanimate things to that of animate beings. I want to suggest, quite to the contrary, that the idea of growing might

be extended in the reverse direction, from the animate to the inanimate. What we call 'things', too, are grown. In practice, there is more to the manufacture of artefacts than the mechanical transcription of a design or plan, devised through an intellectual process of reason, onto an inert substance. For as I shall show in Chapter Eighteen, the forms of artefacts are not given in advance but are rather generated in and through the practical movement of one or more skilled agents in their active, sensuous engagement with the material. That is to say, they emerge – like the forms of living beings – within the relational contexts of the mutual involvement of people and their environments. Thus there is, in the final analysis, no absolute distinction between making and growing, since what we call 'making things' is, in reality, not a process of transcription at all but a process of growth.

Chapter Six

A circumpolar night's dream

> Sometime a horse I'll be, sometime a hound,
> A hog, a headless bear, sometime a fire;
> And neigh, and bark, and grunt, and roar, and burn,
> Like horse, hound, hog, bear, fire, at every turn.
> > William Shakespeare, *A Midsummer*
> > *Night's Dream* (3, i, 97–100)

INTRODUCTION: OF THINGS AND BEINGS

We are accustomed to calling animals and plants 'living things'. But we call ourselves 'human beings'. Let us agree that plants and animals, human and non-human, are all organisms. The question then arises: is an organism a thing or a being? This is by no means an issue of mere semantics, for on the answer hangs our understanding of life itself. If life is a property of things, then it must be reducible to some internal principle, the possession of which distinguishes the class of objects we call organisms from classes of other kinds, and which – from its position within the organism – drives the latter's development and its interactions with the environment. But if life is tantamount to being, then we have to regard the organism not so much as a living thing than as the material embodiment of a certain way of being alive. In other words, we should think of the organism not as containing life, or expressing it, but as emergent within the life process itself.

Now natural science, including the science of evolutionary biology, has developed in the West as an inquiry into the objective properties of things. Thus the applicability of evolutionary biology to humans depends upon our accepting that they, in a sense, are things as well. Yet *they are us*, and were we but things, how would we be able to recognise ourselves for what we are? Paradoxically, if organisms are things, then to see ourselves as organisms we must be *more* than organisms. Indeed it is precisely by this 'excess' that we are inclined to define the scope of our common humanity. Whereas an animal such as a bear or a chimpanzee is all organism, the human being is said to be an organism 'plus . . .' (Collins 1985). Its organic nature is supposedly topped up with some additional factor – call it mind or self-awareness – that can be found not by external observation but only by the knowledge we have of ourselves as possessing specific identities, feelings, memories and intentions.

Herein lies the curious, split-level image of human existence which is such a characteristic feature of modern thought and science. Surely, as science insists, humans are part of nature. They are biological organisms, composed of the same stuff, and having evolved

according to the same principles, as organisms of every other kind. Like other creatures, they are born, grow old and die, they must eat to live, protect themselves to survive and mate to reproduce. But if that were all there is to it, how could there be science? It would seem that the very possibility of a scientific account of humankind as a species of nature is only open for a creature for whom being is knowing, one that can so detach its consciousness from the traffic of its bodily interactions in the environment as to treat the latter as the object of its concern. To be human in this sense – to exist as a knowing subject – is, we commonly say, to be a *person*. So is the scientist a person rather than an organism? How can we exist both inside the world of nature and outside of it, as organisms and persons, at one and the same time?

There seems to me to be only one way out of the paradoxes and contradictions entailed in modern science's attitude to humanity. This is to build on the premise that all organisms, including human ones, are not things but beings. As beings, persons *are* organisms, and being organisms, they – or rather we – are not impartial observers of nature but participate from within in the continuum of organic life. In order to demonstrate the possibility of an account of the living world founded on this premise, and to spell out some of its implications, I shall draw in this chapter on one particular anthropological study of how people in a non-Western society perceive themselves and the world around them. This is the account by A. Irving Hallowell of what it means to be a person among the northern Ojibwa, indigenous hunters and trappers of the forests to the east of Lake Winnipeg and north of Lake Superior in Canada.[1]

Hallowell's article, 'Ojibwa ontology, behavior and world view' (OO), first published in 1960, is in my estimation one of the great classics of northern circumpolar ethnography.[2] I have turned to it over and over again for inspiration, and every reading has yielded some new insight. I must emphasise, however, that what follows is not intended as a contribution to Ojibwa ethnography. I have not carried out fieldwork in the region, nor do I have the deep familiarity with the literature on these people that would qualify me for such a task. Rather, I offer some reflections which, though stimulated by a reading of Hallowell's work, are primarily motivated by the goal set out above – that is, of restoring human beings to the organic lifeworld in a way that does not, at the same time, reduce them to mere objects of nature. These reflections are not, however, entirely without ethnographic substance, for they resonate both with themes that crop up with remarkable regularity in the literature on northern circumpolar societies,[3] and with my own outlook which has undoubtedly been shaped by the experience of working in this region.

ANIMALS AS PERSONS

It is customary, in the West, to assume that to speak of persons is to tell of the thoughts, intentions and actions of human beings. 'Person' and 'human' are all but synonyms – to the extent that to ask whether non-human animals can be persons seems almost perverse. Nevertheless, people in Western societies do very often treat animals, or speak of them, *as if* they were persons. Let me briefly present two examples of this tendency. The first lies in attitudes towards household pets. Many people who are convinced that, as a general rule, animals cannot be persons, are quick to make an exception of their pets. But if you ask them why pets are persons, or at least rather like persons, whereas other animals are not, they will probably say that on account of having been raised in human households, virtually as members of the family, these particular animals have become almost human themselves. They are credited with human feelings and responses, spoken to and expected

to understand, given names, put through life-cycle rituals, and sometimes even dressed in clothing. Thus, far from softening or obscuring the boundary between humanity and animality, the special treatment of pets constitutes the exception that proves the rule: namely that, in the West, to be a person is to be human. Animals can only be persons to the extent that some of our humanity has, so to speak, 'rubbed off' on them through close contact with human members of the household. And just as the animal can never become *fully* human, its personhood, too, can never be more than partially developed. That is why pets are often treated as somehow retarded, locked in perpetual childhood. However old they are, they are never allowed to grow up, but are rather treated as cases of arrested development.

The second example of the Western tendency to liken animals to persons concerns fables, especially those composed for children. Our story-books are full of tales in which human characters are turned or turn themselves into wolves, bears, mice, frogs, birds, fish, and a host of other creatures. Some of these stories are of great antiquity. But whatever they may have meant for people in the distant past, for contemporary audiences and readers there is never any suggestion that they are anything *but* stories. The animal characters, often depicted in strikingly human form, stand in metaphorically for human ones, and serve to illustrate distinctively human dispositions and foibles – the cunning fox, the innocent deer, the conceited toad, the noble lion, and so on. In short, the animal characters are used to deliver a commentary on the nature of *human* society. Moreover no child, raised in contemporary Western society, would make the mistake of confusing such animal stories with natural history books, of supposing that 'The Princess and the Frog' is an observer's account of the behaviour of amphibians, or that 'Little Red Riding Hood' is an account of the habits of the wolf. Children are taught, at a very early age, to distinguish between telling stories and recounting the 'facts'.

Both these examples, of pet-keeping and fables, illustrate a propensity, technically known as anthropomorphism, to ascribe human qualities to non-human beings. In the one case, the ascription is metonymic (the animal is an extension of the human), in the other case it is metaphoric (the animal substitutes for the human). Either way, so long as we continue to assume that only humans can truly be persons, the attribution of personhood to animals is bound to be anthropomorphic.[4] The Ojibwa, however, do not make this assumption. Persons, in the Ojibwa world, can take a great variety of forms, of which the human is just one. They can also appear in a variety of animal guises, as meteorological phenomena such as thunder or the winds, as heavenly bodies such as the sun, and even as tangible objects such as stones that we would have no hesitation in regarding as inanimate. None of these manifold forms in which persons appear is any more basic, or 'literal', than the others. Moreover, as we shall see, persons can be encountered not only in waking life but also, and equally palpably, in dreams and in the telling of myths. And most importantly, they can change their form. Indeed for the Ojibwa this capacity for metamorphosis is one of the key aspects of being a person, and is a critical index of power: the more powerful the person, the more readily a change of form may be effected.

Though persons may appear in animal form, not all animals are persons. One can usually tell if an animal is a person, because its behaviour will be out of the ordinary. But some animals are always extraordinary. One such is the bear. The hunter, on encountering a bear, will act towards it as a person who can understand what is being said and will respond according to its own volition (OO, p. 36). There is nothing in the least anthropomorphic about this. The hunter is not regarding the bear as if it were human. To the contrary, it is perceived to be unequivocally ursine. Unlike the pet in a Western

society, the personhood of the bear does not depend upon its previous contacts with humans – indeed it need not have had any such contacts at all. For the same reason, the bear is just as much a 'full person' as is the human hunter. Ojibwa relate to persons in animal form as grown-ups, not as children. And whereas anthropomorphised animal-persons in the West are treated as beings that need to be looked after and controlled by their human guardians, the animal-persons in the environment of the Ojibwa are considered to be on the same level as, if not more powerful than, human beings themselves.

Likewise, the animals that figure as persons in the traditional narratives of the Ojibwa are not anthropomorphic characters. Their tales, like our own, are replete with incidents in which humans turn into animals, or marry animals, or give birth to animals, and vice versa. But these are not fables, nor are they intended to deliver an allegorical commentary on the human condition. They are tales about events that really took place, in the histories of real persons, and in the same world that people ordinarily experience in the course of their quotidian lives. What they recount is based on detailed, accurate observation of the landscape, of weather conditions and of the behaviour of animals. The mythological figure of the Thunder Bird, for example, can make itself manifest in the form of a peal of thunder or a kind of hawk. There is a striking correspondence between the normal seasonal occurrence of thunderstorms and the period during which migratory birds wintering in the south appear in Ojibwa country. In one myth, a man who marries a Thunder Bird woman and goes off to live with his in-laws (the mythic 'masters' of various species of hawk) finds himself having to eat what they call 'beaver', but what to him are frogs and snakes – which are, indeed, the principal foods of the sparrow hawk.[5] And the nests of the Thunder Birds can be physically identified in the landscape as collections of stones in high, inaccessible locations (OO, pp. 32–3).

In short, what distinguishes the Thunder Bird from any ordinary hawk is nothing like what, for us, distinguishes the Wolf of Little Red Riding Hood from the wolf of the forest. The distinction is not between animals of fantasy and of fact, but rather between animals that are persons and animals that are not. Animal persons are no more fantastic than human ones. Ojibwa do, nevertheless, differentiate between narratives of past experience of these two sorts of person. Hallowell calls them 'myths' and 'stories' respectively (OO, pp. 26–7). Stories recount events in the lives of human beings, from the anecdotal to the legendary. Myths, by contrast, tell of the lives of non-human persons – or, to be more precise, the myths *are* these persons, who, in the telling, are not merely commemorated but actually made present for the assembled audience, as though they had been brought to life and invited in. For this reason, the narration of myth is a ritualised event, and there are restrictions on who can tell it and when it can be told. But despite these formalities, myths are no less true, or more phantasmagoric, than stories. The difference is simply that in myths, the protagonists are persons of the 'other-than-human' class, otherwise known and addressed by the inclusive kinship term, 'grandfathers'.

OTHER-THAN-HUMAN GRANDFATHERS

All persons, whether human or not, share the same fundamental structure. This structure consists, in Hallowell's words, of 'an inner vital part that is enduring and an outward form which can change' (OO, p. 42). The inner essence, or soul, holds the attributes of sentience, volition, memory and speech. Any being that possesses these attributes is a person, irrespective of the intrinsically unstable form in which it appears. Now while human persons and other-than-human grandfathers are alike in this regard, such that no

absolute division in kind can be drawn between them, they do differ in degree – that is, in the amount of power a person possesses and hence in their capacity for metamorphosis. Grandfathers are more powerful than living humans. Most powerful are the Sun, the Four Winds, the Thunder Birds, and the spirit 'masters' of all the different species of animals. These beings are immortal, but can change their form with relative ease, appearing now as a human, now as an animal, now perhaps as some meteorological phenomenon – as we have seen with the Thunder Bird. In myth the Bird can figure as a man or woman, in dreams it shows up as a hawk, in waking life it announces its presence as a thunder-clap. By contrast, only the most powerful human persons, such as sorcerers and shamans, can change into a non-human form and make it back again – and then only with some danger and difficulty. Sorcerers, for example, can transform themselves into bears in order better to pursue their nefarious activities.

However for most humans, metamorphosis means death: indeed the only change of form that *all* humans undergo is brought about upon their demise. As with any meta-morphosis, death involves an alteration of manifest appearance, while the vital essence of the person continues its existence in some other form. Spirits of the dead are that much more powerful, and can manifest themselves in the guise of either ghosts (which may be seen or heard) or animals, often birds.[6] But whereas the power of human persons always increases when they die, there is only one way in which they can grow in power during their lifetimes, and that is through the guardianship or tutelage of one or more grandfa-thers. For men in particular, grandfatherly assistance is considered crucial for coping with the vicissitudes of life. In the past, every boy, on reaching puberty, would embark upon a prolonged period of fasting. Alone in the forest, he would hope to dream of his future guardian, from whom he would receive blessings that would see him through all kinds of difficulties in later life – so long as he met certain necessary obligations towards the grand-father concerned. In one account, for example, a boy encountered a human-like figure in his dream, who then turned into a golden eagle. This person was the 'master' of the eagles. The boy, too, was transformed into an eagle in his dream – thus winged and feathered, he flew to the south with his new protector, before returning to the point whence he originally departed (Hallowell, *Culture and Experience* (CE), 1955, p. 178).

Now the idea that a human being can be turned into a bear prowling in the forest, or an eagle soaring in the sky, is simply inconceivable within the normal canons of Western thought. Any creature born of human parents, it is supposed, is bound within the limi-tations of the human bodily frame, whatever environmental circumstances may be encountered during its lifetime. It is these bodily specifications that are fixed and enduring, whereas ways of thinking, feeling, speaking and behaving – adding up to what is conven-tionally known as 'culture' – are variable, even within the life-history of a single individual. This seems to be the precise inverse of the Ojibwa model of the person, according to which it is the variable body that clothes a constant spiritual essence comprising the powers of self-awareness, intentionality, sentience, and speech. In their encounter with Euro-Americans, Ojibwa were evidently troubled by the incompatibility between these different ontologies of personal being. John Tanner, a white man who grew up among Ojibwa people during the early nineteenth century and subsequently wrote of his experiences, claimed that the ursine sorcerer, prowling around at night, was actually a man *dressed up* in a bear skin (CE, p. 177). This, and other similar statements by both native and non-native informants, may be understood, according to Hallowell, as 'rationalizations advanced by individuals who are attempting to reconcile Ojibwa beliefs and observation with the disbelief encountered in their relations with whites' (OO, p. 37).

Rendering metamorphosis as a kind of dressing up is certainly one way of explaining it – or rather, explaining it away – in terms that Westerners would understand. The person's bodily form does not *actually* change, it is merely concealed beneath an outer clothing, a disguise. Yet as Viveiros de Castro has noted (1998), the description of metamorphosis as an enclothing of the soul, far from being a peculiar response to ontological disjuncture, is very widely reported in the ethnography of native Amerindian peoples. Contrary to Hallowell's interpretation, it seems that the idea of dressing up is not, in itself, foreign to indigenous understanding. What is foreign is rather the idea that the function of clothing is to disguise or conceal. In Amerindian cosmology, clothing does not cover up the body, it *is* a body (Viveiros de Castro 1998: 482). It serves, in other words, not to conceal but to enable, furnishing the distinctive equipment – including skills and dispositions as well as anatomical devices – by which a person can carry on a particular kind of life in the world. Viveiros de Castro (*ibid.*) likens the adoption of a specific bodily form to the diver's donning of a wet-suit, the purpose of which is not to disguise the wearer as a fish, but to enable him to swim like one. Thus metamorphosis is not a covering up, but an *opening up*, of the person to the world. A person who can take on many forms can turn up in all kinds of situations, now in one form, now in another, each one affording a different perspective. The greater the person's powers of metamorphosis, the wider the range of their practical possibilities of being, and hence the more extensive the breadth of their experience and the scope of their phenomenal presence.

The idea that by clothing himself with the bodily forms of one animal after another, the wearer is enabled to proceed through a series of trials calling for diverse strengths and capabilities, is beautifully illustrated by an Ojibwa story collected by Homer Huntington Kidder in the 1890s. The storyteller was Jacque LePique, a character of mixed parentage and fluent in English and Canadian French as well as Ojibwa and Cree. The tale concerns a man named Iron Maker who, along with eleven companions, sank to the bottom of a lake after their boat had capsized. Following an encounter at the lake bottom with an old man, an old woman and a snake, Iron Maker found himself gasping for breath at the surface of the water.

> He thought of the beaver, whereupon the beaver came to him and gave him his body. He swam towards the shore, but before he could reach it, he felt himself losing the power to keep the shape of the beaver. So he thought of the otter. Then the otter gave him his body, and in that form he reached land.
>
> There Iron Maker found himself naked in his own body. It was freezing weather . . . He would have died of cold but for the help of four other animals which, one after another, lent him their bodies to get home: First the bear, in whose shape he went a good way, then the lynx, then the raccoon, and after that the ox (buffalo).
>
> When Iron Maker no longer had the power to keep the shape of the ox, he was pretty near his lodge. He ran home naked and fell at the door half dead with cold.
>
> (in Bourgeois 1994: 69)

Like Puck in Shakespeare's *Midsummer Night's Dream* – whose lines head this chapter, and who threatened to appear in the forms, successively, of a horse, a hound, a hog, a headless bear and a fire – Iron Maker made it home from the bottom of the lake, first as a beaver, then as an otter, then as a bear, a lynx, a raccoon and an ox.

Now all of this leaves us with a problem of the following kind. We may accept that a person can change their form at will, knowing all the while that the character in question

exists, like Shakespeare's Puck, only as a *dramatis persona* in a masque or play, who is actually being impersonated by an ordinary human actor. But if I were to report, in all sincerity, having encountered such a character as Puck or Iron Maker in real life, I doubt whether much credence would be given to my claims. People would say that if I was not actually lying, then I must be suffering from delusions, leaving me incapable of telling fact from fantasy, or reality from dreams. Yet these are precisely the sorts of claims that Ojibwa make. Are they, then, lying or deluded?

Accusations of both kinds have been levelled often enough, against Ojibwa people and others who think like them, reinforcing the stereotype of the primitive Indian who can neither think logically nor be trusted. Anthropologists, by temperament and training, are inclined to be rather more sympathetic to native accounts. By and large, however, they adopt an expository strategy not unlike that of the theatre-goer attending a performance of Shakespeare's *Dream*, amounting to a willing suspension of disbelief. This strategy makes it possible to get on with the job of understanding what people are telling us, without our having to worry about whether there is any foundation in reality for what they have to say (see Chapter One, p. 14). Hallowell himself does just this, when he argues that what, for the Ojibwa, are attributes of personhood form part of a comprehensive 'worldview' that is projected onto reality-as-we-know-it. His concern is to understand the world view, not the fundamental nature of reality. Yet he goes on to stress that Ojibwa do not, themselves, 'personify' natural objects (OO, p. 29). For example, the sun is perceived as a person of the 'other-than-human' class; it is not perceived initially as a natural object onto which 'person' attributes are subsequently projected. It is not, in other words, *made* into a person; it is a person, period.

Now there is more than a hint of duplicity here. It would be a mistake, says Hallowell, to suppose that Ojibwa personify objects, yet from his standpoint as an anthropological observer, this appears to be precisely what they are doing. Evidently what Hallowell takes to be a particular cultural construction of an external reality is, in Ojibwa eyes, the only reality they know. For the Ojibwa, the sun is a person because it is experienced as such; for Hallowell the sun is not *really* a person but is constructed as such in the minds of the Ojibwa. And if it is not really a person, then it cannot really undergo metamorphosis. By this move, Ojibwa metaphysics appear to pose no challenge to our own ontological certainties. Turning our backs on what Ojibwa people say, we continue to insist that 'real' reality is given independently of human experience, and that understanding its nature is a problem for science. Must we then conclude that the anthropological study of indigenous understandings, whatever its intrinsic interest, can tell us nothing about what the world is really like, and that it therefore has no bearing on natural scientific inquiry?

LIVING THINGS AND BEING ALIVE

This question returns us to the paradox I raised in the introduction. The notion that persons, as beings in the world, can appear in both human and other-than-human forms may sound strange, but it is not half as strange as the notion that to become a person – to be in a position to know and reflect upon the nature of existence – means taking oneself *out* of the world. The challenge for us now is to bring the person, as it were, back 'down to earth', to restore it to the primary context of its engagement within an environment. Taking this condition of engagement as our point of departure, can we find some way of making sense of Ojibwa understandings concerning such matters as metamorphosis? Can we, in other words, ground these understandings in the real experience of

persons in a lifeworld rather than attributing them to some overarching cosmological schema for its imaginative reconstruction? To begin to address this challenge, we need to go back to a question which is even more fundamental than that of what makes a person. What makes something alive, or animate?

Hallowell recounts a fascinating anecdote concerning the nature of stones:

> I once asked an old man: Are *all* the stones we see about us here alive? He reflected a long while and then replied, 'No! But *some* are.' This qualified answer made a lasting impression on me.
>
> <div align="right">(OO, p. 24)</div>

Now Hallowell had been led to ask this question on account of a peculiarity in the grammatical structure of the Ojibwa language. Like other languages in the Algonkian family to which it belongs, a formal distinction is allegedly made in this language between 'animate' and 'inanimate' nouns. Stones are grammatically animate, and Hallowell was keen to know why. The answer he received, however, was puzzling in two respects. First, there is the general question of how something as apparently inert as a stone can possibly be alive. But secondly, why should some stones be animate and others not? As Hallowell recognises (OO, p. 23), the categorical distinction between animate and inanimate is not one that Ojibwa articulate themselves, but was rather imposed by Western linguists who brought with them their own conventional understanding of what these terms mean. Before attempting to resolve the puzzle of the stones, we have, therefore, to pause to consider the meaning of the animate as a category of Western thought.

Ever since Plato and Aristotle, it has been customary in the West to envisage the world of nature as made up of a multitude of discrete objects, things, each with its own integrity and essential properties. These things may be grouped into classes of varying degrees of inclusiveness on the basis of selected properties that they are perceived to possess in common. One major class, known as 'animate', comprises all those things that are said to possess the property of life. All remaining things, that do not possess this property, are 'inanimate'. There has been much debate about what it takes for something to be alive: vitalists argued for the existence of some mysterious life-force that they thought was infused into all organisms; mechanists dismissed the idea as unscientific hocus-pocus, but in their enthusiasm to reduce organisms to clockwork they virtually dissolved the animate into the category of the inanimate. The problem was only resolved, after a fashion, by the discovery of the DNA molecule, popularly hailed as the 'secret of life', which seemed to offer a basis for distinguishing living things that satisfied the objective canons of natural science. Throughout all this debate, however, one fundamental idea has remained unquestioned, namely that life is a qualifying attribute of objects. We look for it in a world that already consists of things-in-themselves, whose essential nature is given without regard to their positioning and involvement within wider fields of relations.

Now these are the kinds of things – stones, trees, birds, and so on – that are denoted by words of the class grammarians call 'nouns'. Thus to place the Ojibwa word for stone in the grammatical category 'animate noun' is to assume that so far as the language is concerned, all stones are things with the essential attribute of life. The same would go for trees, the sun and moon, thunder, and artefacts like kettles and pipes, the words for which are likewise placed in the 'animate' class (OO, p. 23). Judging from his qualified response, this is something that even the old man whom Hallowell questioned on the matter would have found hard to accept. Reflecting on his answer, Hallowell concludes

that 'the Ojibwa do not perceive stones, in general, as animate, any more than we do. The crucial test is experience. Is there any personal testimony available?' (OO, p. 25). And indeed, such testimony can be adduced: Hallowell heard tell of an instance in which, during a ceremony, a stone was observed to roll over and over, following the master of the ceremony around the tent, another in which a boulder with contours like a mouth would actually open its 'mouth' when tapped by its owner with a knife, and yet another where a man asked a particular stone whether it belonged to him and received a negative response!

The critical feature of all these examples is that the liveliness of stones emerges in the context of their close involvement with certain persons, and relatively powerful ones at that. Animacy, in other words, is a property not of stones *as such*, but of their positioning within a relational field which includes persons as foci of power.[7] Or to put in another way, the power concentrated in persons enlivens that which falls within its sphere of influence. Thus the animate stone is not so much a living thing as a 'being alive'. This immediately makes sense of the old man's remark, for whether a stone is alive or not will depend upon the context in which it is placed and experienced. It also explains why animacy is attributed to artefacts (like kettles and pipes) that are closely bound up with the lives of persons. But by the same token, it makes a nonsense of the categorical distinction between living and non-living things. It is simply not the case, as Scott Atran confidently asserts, that people universally divide 'natural objects' into two classes, such that every object either is, or is not, of a 'living kind' (Atran 1990: 56). The point is not that Ojibwa draw classificatory distinctions along different lines, but rather that in their ontology, life is not a property of objects at all, but a condition of being.

Indeed strictly speaking, there are no 'natural objects' in the Ojibwa world to classify. As Mary Black has shown through a reanalysis of Hallowell's ethnography, it is not by their natures that Ojibwa identify the objects in their everyday environment, as though each were independently endowed with a fixed combination of distinctive features. Rather these objects are apprehended 'in terms of characteristics that *define them* as unstable, changing and inconsistent'. The nature of the things one encounters, their essence, is not given in advance but is revealed only 'after-the-fact', and sometimes only after the lapse of some considerable period of time, in the light of subsequent experience – which of course may differ from one person to another. This Ojibwa way of dealing with perception is, as Black puts it, fundamentally *antitaxonomic*, reducing to a shambles any attempt to bring it within the bounds of a neatly ordered system of classificatory divisions (Black 1977a: 101–4). Black's own field research, conducted among the Ojibwa in the 1960s, lends support to these conclusions. The one thing on which her informants were agreed was in their dismissal of the tidy classifications of formal linguistic analysis. They did not regard classes such as animate and inanimate as mutually exclusive, and objects could freely shift from one class to the other, depending on the context (Black 1977b: 143).

Most significantly for our current concerns, Black also notes that the Ojibwa term *bema.diziwa.d*, which comes closest to 'living things', literally translates as 'those who continue in the state of being alive'. Yet the term might be more accurately glossed, she suggests, as 'those who have power'. Now Hallowell tells us that the Ojibwa word for life 'in the fullest sense', including health, longevity and good fortune, is *pimädäziwim*. As such, it is something that every person strives to achieve (OO, p. 45). But life in this sense is not given, ready-made, as an attribute of being that may then be expressed in one way or another. It is rather a project that has continually to be worked at. Life is a task.[8] As an ongoing process of renewal, it is not merely expressive of the way things are,

but is the very *generation* of being. And power, in effect, is the potential of the life process to generate beings of manifold forms. Thus conceived, it is a property not of individuals in isolation but of the total field of relations in which they are situated. Only within such a field can a person strive for *pimädäziwim* (OO, p. 48).

Let me return, for a moment, to the case of the rolling stone that followed its master around the ceremonial tent. On what grounds was it judged to be alive? Clearly, the critical criterion was that it had been observed to move. It did not move of its own volition, since it was controlled by the power of the master; nevertheless the stone acted, it was not acted upon – for example by being pushed or pulled. But once again, in coming to terms with this phenomenon, we must be wary of the characteristically Western assumption that the world is full of things which may or may not move of their own accord, depending on whether they are of the animate or inanimate class. As we have seen, it would make no more sense to the Ojibwa than it does to us to suppose that the stone exists as a living thing, as though the property of life were an aspect of its substantive nature, of its 'thinginess', *as distinct* from its movement in the world.[9] The movement is not an outward expression of life, but is the very process of the stone's being alive. The same could be said of trees, which are included in Hallowell's list of things formally classified in Ojibwa grammar as 'animate' (OO, p. 23). The Western biologist would doubtless be more inclined to regard the tree than the stone as a 'living thing', by appeal to some aspect of its substantive nature such as DNA or carbon chemistry. For the hunter in the woods, however, what makes a tree alive are its distinctive movements as they are registered in experience: the swaying of its boughs in the wind, the audible fluttering of leaves, the orientation of branches to the sun. Recall that the winds and the sun are persons for the Ojibwa, and can move trees much as powerful humans can move stones.

Different beings, whether or not they qualify as persons, have characteristic patterns of movement – ways of being alive – which reveal them for what they are. The sun, for example, has its own regular pattern of rising and setting, a regularity that, in Hallowell's words, 'is of the same order as the habitual activities of human beings' (OO, p. 29). If we were to consider the sun in abstraction from its observed movement across the sky, then it would indeed appear to be a mere physical body, and its movement a mechanical displacement. But this is not how it is presented to us in immediate experience. Rather, the movement is as much a part of the way the sun is as my own habitual movements are of the way I am. And these movements, of the sun in the heavens, of trees in the wind, of animals and human beings as they go about their everyday tasks, do not take place against the backdrop of a nature that is fixed, with its locations and distances all laid out in advance. For they are part and parcel of that total life process, of continuous generation, through which the world itself is forever coming into being. In short, living beings do not move upon the world, but move along with it.[10] I return to this theme in Chapter Eleven (pp. 198–201).

THE MEANING OF EXPERIENCE

At this point I would like to return to Hallowell's observation, apropos the vitality of stones, that 'the crucial test is experience' (OO, p. 25). What are we to understand by this key word, 'experience'? And what, precisely, is being tested? One approach to answering these questions might be to argue as follows. There exists on the one hand a real world 'out there', customarily called nature, whose forms and composition are given quite independently of the human presence, and on the other hand a world of ideas or mental

representations, which bears a relation of only partial correspondence to this external reality. Some things in the world are not represented in the mind, but some images in the mind have no counterpart in the real world. It is experience that mediates between the two worlds, providing both the raw material – in the form of sensory data – from which ideas are constructed, and the opportunities to test them by empirical observation. Thus at first glance we might form the impression that a certain stone actually moved; this could then be checked by further examination which would either confirm or refute the initial hypothesis.

For the Ojibwa, however, knowledge does not lie in the accumulation of mental content. It is not by representing it in the mind that they get to know the world, but rather by moving around in their environment, whether in dreams or waking life, by watching, listening and feeling, actively seeking out the signs by which it is revealed. Experience, here, amounts to a kind of sensory participation, a coupling of the movement of one's own awareness to the movement of aspects of the world. And the kind of knowledge it yields is not propositional, in the form of hypothetical statements or 'beliefs' about the nature of reality, but personal – consisting of an intimate sensitivity to other ways of being, to the particular movements, habits and temperaments that reveal each for what it is. Indeed such knowledge, closely analogous to that which the skilled craftsman has of his raw material, is not easily articulated in propositional form, and would seem to be devalued by any attempt to do so – to disembed it from its grounding in the context of the knower's personal involvement with the known. This is probably the reason why a young man who, through a dream encounter, has secured the blessing of an other-than-human 'grandfather', is forbidden under normal circumstances to speak of his experience in any detail (OO, p. 46). You keep such things to yourself – although others can tell, from your subsequent attitudes and behaviour, that you have a new guardian in your life.

'The concept of the "natural"', Hallowell tells us, 'is not present in Ojibwa thought' (OO, p. 28).[11] Experience, therefore, cannot mediate between mind and nature, since these are not separated in the first place. It is rather intrinsic to the ongoing process of *being alive to the world*, of the person's total sensory involvement in an environment. What then does experience put to the test? Let me try to answer this question by way of another example. Visual sightings of the Thunder Bird in its hawk-like manifestation are exceedingly rare, yet one boy's report of such a sighting – initially greeted with some scepticism – was finally accepted when his description was found to match precisely that offered by another man who had encountered the same bird in a dream (OO, p. 32, see also Callicott 1982: 305). People can lie about their encounters with other-than-human persons, sometimes with dire consequences, but in this case the boy must have been telling the truth. How, otherwise, could he have described the bird so accurately? However the conditions of truth, in this case, lie not in the correspondence between an external reality and its ideal representation, but in the authenticity of the experience itself. Rather than confirming the factual existence of the Thunder Bird as an experience-independent datum of nature, the boy's vision was proof of his exceptional powers of perception. It is these powers that are being constantly tested by experience.

Moreover experiences of this kind are formative. They contribute to the shaping of a person's own sense of self, and of their attitudes and orientations towards the world. Or in short, experience is intrinsic to the generative process wherein persons – both human and other-than-human – come into being and pursue the goal of life, each within the field of their relations with others. And as Hallowell pointed out in his classic article on 'The self and its behavioral environment' (CE, Ch. 4), the process is a mutual one. The

formation of the self is, at one and the same time, the formation of an environment for that self, and both emerge out of a common process of maturation and personal experience. Through this process, 'an intelligible behavioral environment has been constituted for the individual that bears an intimate relation to the kind of being he knows himself to be and it is in this behavioral environment that he is motivated to act' (CE, pp. 85–6). The self, in this view, is not the captive subject of the standard Western model, enclosed within the confines of a body, and entertaining its own conjectures about what the outside world might be like on the basis of the limited information available to it. On the contrary, for Hallowell – as indeed for the Ojibwa who have exercised such an obvious and profound influence on his thought – the self exists in its ongoing engagement with the environment: it is *open* to the world, not closed in.

At first glance, however, this view of the self seems inconsistent with the structure of personhood that Hallowell attributes to the Ojibwa. Recall that this structure consists of an inner part that endures and an outward appearance that is susceptible to transformation. Does this not imply that the self is enclosed within its bodily garb? We have already seen how the Ojibwa, in common with many other Amerindian peoples, liken the body to a suit of clothing donned by the soul. Not infrequently, indeed, it is compared to a box-like container. But just as clothing does not necessarily imply disguise or cover-up, so containment is not equivalent to enclosure, confinement, or immobilisation. Rather, the body as container is conceived as a kind of vehicle that serves to extend the spatiotemporal range of a person's movement, influence and experience. Thus what Hallowell, in his characterisation of the Ojibwa person, calls its inner essence is not trapped inside the outward form but rather lies behind it – behind the superficial world of appearances. To penetrate beneath the surface of the person is not, then, to go inside into the mind rather than outside into the world. It is rather to dissolve the very boundary that separates mind from world, and ultimately to reach a level where they are one and the same. Nothing better illustrates this point than the difference between Western and Ojibwa interpretations of dreaming.

DREAMING AND METAMORPHOSIS

People in the West are encouraged to think of dreams as hallucinations, comprising a stream of free-floating images that exist only in the interiority of the unconscious mind, a mind that is freed during sleep from its bodily bearings in the real world. Thus we consider the dreamworld to be the very opposite of the solid, physical world 'out there', just as illusion is opposed to reality, fantasy to fact. For the Ojibwa, by contrast, the world of dreams, like that of myth, is continuous with that of one's waking life. Just as myths are understood as the past experiences of other-than-human persons, so dreams are among the past experiences of human selves (CE, p. 181). In their dreams, humans meet the grandfatherly protagonists of myth, and carry on activities with them in a familiar landscape, albeit viewed from an unfamiliar perspective, revealing secrets of the environment that one may not have noticed before but whose presence is invariably confirmed by subsequent inspection. This is not to say that Ojibwa confuse dream experiences with those they have while wide awake. The difference is that in dreams, the vital essence of the person – the self – is afforded a degree of mobility, not only in space but also in time, normally denied in waking life. While the body of the sleeper is readily visible at some fixed location, the self may be roaming far afield (OO, p. 41). A sorcerer, for example, may be observed lying asleep in his tent, but in his dream he meets you while you were

out hunting in the forest. And sure enough, when you were hunting recently, you had an unnerving encounter with a bear. The bear was the sorcerer, who was 'bearwalking' (OO, p. 36).[12]

Both Western and Ojibwa people might agree that in a certain sense, dreaming liberates the mind from its bodily housing. But whereas in the Western conception, this amounts to a taking leave of reality, for the Ojibwa it allows complete freedom of movement *within* the earthly and cosmic space of ordinary life (Callicott 1982: 304). The dreaming mind, far from cutting its already tenuous and provisional connection with the real world, is able to penetrate that world to the point where mind and world become indistinguishable. This difference of interpretation has its roots in fundamental ontological assumptions. Mainstream Western philosophy starts from the premise that the mind is distinct from the world; it is a facility that the person, presumed human, brings to the world in order to make sense of it. When it is not busy making sense of the world, during 'time off', it dreams. For the Ojibwa, on the other hand, the mind subsists in the very involvement of the person in the world. Rather than approaching the world from a position outside of it, the person in Ojibwa eyes can only exist as a being *in* the world, caught up in an ongoing set of relationships with components of the lived-in environment. And the meanings that are found in the world, instead of being superimposed upon it by the mind, are drawn from the contexts of this personal involvement. Thus the dreaming self in its nocturnal journeys, far from taking a break from the demands of coping with reality, sets out in search of meanings that will help to make sense of the experiences of waking life.

With these observations in mind, let me return to the problem of metamorphosis. How are we to respond to the objections of the sceptic to the effect that whatever people may say, humans cannot *really* turn into eagles or bears, or thunder into a kind of hawk, or vice versa? From an Ojibwa perspective, this objection is not so much false as beside the point. Metamorphosis may not occur in ordinary waking life, but it certainly occurs in dreams. And as Hallowell is at pains to stress, 'there is nothing psychologically abstruse about the incorporation of dreams into the category of self-related experiences' (CE, p. 96). The awareness of the self is as phenomenally real when one is dreaming as when one is awake, and these dream experiences are built into the constitution of the self by memory processes that are no different from those working on the experiences of waking life. Consider the case of the boy who, in the midst of a storm, witnessed the Thunder Bird in its hawk-like guise. What if he was only dreaming? Even when awake, we too can sometimes let our imaginations wander, and see things that are not 'really' there. But from the point of view of the experience of the self, it makes no difference whether the boy was awake, day-dreaming or actually asleep. He still saw the bird, was moved to wonder by its presence, and remembered the encounter for the rest of his life. Experiences undergone when asleep are just as much a part of autobiographical memory as are experiences when awake (OO, p. 42).

If, then, we accept that whether awake or asleep, the person's encounters are those of a being-in-the-world, it follows, as Hallowell puts it, 'that metamorphosis can be *personally* experienced' (CE, p. 180). Far from covering over a solid substrate of literal reality with layer upon layer of illusion, what dreams do is to penetrate beneath the surface of the world, to render it transparent, so that one can see into it with a clarity and vision that is not possible in ordinary life. In dreams, for the Ojibwa, the world is opened up to the dreamer, it is *revealed*. This is why they attach such a tremendous importance to dreaming as a source of knowledge, for the knowledge revealed through dreams is also a

source of power. Of course this knowledge is of a different kind from what people in the West call science. As I pointed out in the introduction to this chapter, the very project of natural science is premised on the detachment of the human subject from the world that is the object of his or her inquiry. The Ojibwa, starting off from the opposite premise – that the subject can exist only as a being *in* the world – have arrived at something quite different: not a natural science but a poetics of dwelling (on this contrast, see Chapter One, pp. 25–6). And it is within the context of such a poetics that Ojibwa ideas about metamorphosis, the personhood of the sun, the winds and thunder, the liveliness of stones, and so on, should be understood.

THE SOUNDS OF SPEECH

I shall return, in the conclusion to this chapter, to the relation between poetics and science. Before doing so, I should like to elaborate further on the contrast between Western and Ojibwa models of the person with particular reference to the criterion which, more than anything else, is adduced to justify claims to the unique status of humanity: namely the capacity for speech. For the Ojibwa, according to Hallowell, the essential powers of personhood include, besides speech, sentience, volition and memory. Those of us brought up in the Western tradition of thought would have no particular problem with this idea. We *do* have a problem, however, when it comes to the attribution of these powers to non-human animals, and even more of a problem in attributing them to things that we would regard as inanimate. To give a lead into this problem, let me recount one more anecdote from Hallowell's Ojibwa study. An old man and his wife are sitting in their tent, and a storm is raging outside. There is thunder and lightning. The thunder comes in a series of claps. The old man listens intently. Then he turns to his wife and asks, quite casually and in a matter-of-fact tone of voice, 'Did you hear what was said?' 'No', she replies, 'I didn't catch it' (OO, p. 34). What are we to make of this?

Certainly, so long as we remain with a Western view of the nature of sentience, volition, memory and speech, the story seems incredible. The language of agency that we are accustomed to use posits a being, the agent, who is endowed with will and purpose, and whose existence and identity are given independently of any action that he or she chooses to initiate. Thus I may or may not choose to speak, or I may decide to say one thing rather than another, but as a being with intentions and purposes – that is, as a person – I am not the same as my speech. Likewise I may choose to clap my hands, but as a physical event in the world, the clap exists apart from myself – the person who claps. Notice the similarity between this notion of agency, as an inherent attribute of persons as distinct from their overt behaviour, and the notion of animacy built into the Western notion of 'living things', which, as we have already seen, construes life as a substantive property of objects as distinct from their movement in the world.

Does the thunder, then, clap like I do? Though we might say 'the thunder claps', we know perfectly well that we are speaking figuratively, as though there were some being in the heavens with intentions and purposes rather like our own, and who claps like a human person, except on a more awesome scale. In reality, we are sure there is no such cosmic being. And to get around the problem of how something can occur without an agent to produce it, we may use an alternative form of words, such as 'there was a clap of thunder'. The point is that thunder does not exist separately from its clap, in the way that I am supposed to exist separately from mine. Rather, the clap *is* thunder; it is the acoustic form of thunder's phenomenal presence in the world. Through the clap, the thunder audibly

exists for those who hear it. Let me put this contrast in another way, while keeping for the moment to the terms of the Western model of personal agency. When I speak, or for that matter when I clap, it is because I have an idea. My concern is to communicate that idea, and I do so by means of coded signs or signals which travel in the medium of sound. By converting ideas in the mind into physical impulses in the world, information is transmitted. But the thunder is *not* transmitting a message. Of course it affects us; we are moved by the sound, perhaps a little scared. But we do not look for a message in the sound or ask, as did the old man in Hallowell's story, 'Did you hear what was said?'

As this example shows, Western thought systematically distinguishes the sounds of speech, along with other sound-producing gestures whose purpose is to give outward expression to inner ideas or mental states, from the sounds of nature that are just there but have not been produced by anybody. My clap and the thunderclap fall on either side of this division. And the dichotomy between interior mental states and their outward physical or behavioural expression that underwrites this conception of the distinctiveness of speech also applies to the way we tend to think about other aspects of personhood – sentience, volition, memory. Thus volition implies the intentionality of action, but Western thought sees intentionality as residing not in the action itself but in a thought or plan that the mind places before the action and which the latter is supposed to execute. Likewise we are inclined to think of memory as a store of images in the mind, rather than of remembering as an activity situated in the world. And we talk about sentience in terms of inner states or 'feelings', instead of focusing on the perceptual activity of feeling the world around us. In short the self, as the locus of ideas, plans, memories and feelings, seems to exist as a substantive entity quite independently of where it is and what it does.

Behind all this is a model of the person which, as we have already seen, identifies the self with an interior intelligence, the conscious mind, enclosed by its physical container, the body. According to this model, the body picks up sensory signals from the world around it and passes them to the mind, which processes them to form images or representations. Through a logical manipulation of these representations, the mind formulates plans of action, which are then passed as instructions for the body to execute in the world. The mind itself may be envisaged as many-layered, with outer layers of consciousness covering over deeper, more subterranean levels of the unconscious. Locked up in there, directly known only to ourselves, are our thoughts, feelings and memories, which can only be released, and made known to others, by way of their bodily enactment in speech and gesture. The Ojibwa model of the person, however, is quite different. As shown schematically in Figure 6.1, this model does not posit the self in advance of the person's entry into the world; rather, the self is constituted as a centre of agency and awareness in the process of its active engagement within an environment. Feeling, remembering, intending and speaking are all aspects of that engagement, and through it the self continually comes into being.

In short, the Ojibwa self is *relational* (Bird-David 1999: S77–8). If we were to ask where it is, the answer would not be 'inside the head rather than out there in the world'. For the self exists, or rather becomes, in the unfolding of those very relations that are set up by virtue of a being's positioning *in* the world, reaching out into the environment – and connecting with other selves – along these relational pathways. Taking this view of the person, as Hallowell does, it is clear that no physical barrier can come between mind and world. 'Any inner–outer dichotomy', he asserts, 'with the human skin as boundary, is psychologically irrelevant' (CE, p. 88). But this is precisely the dichotomy, as we have seen, by which speech and similar expressive gestures are conventionally distinguished from
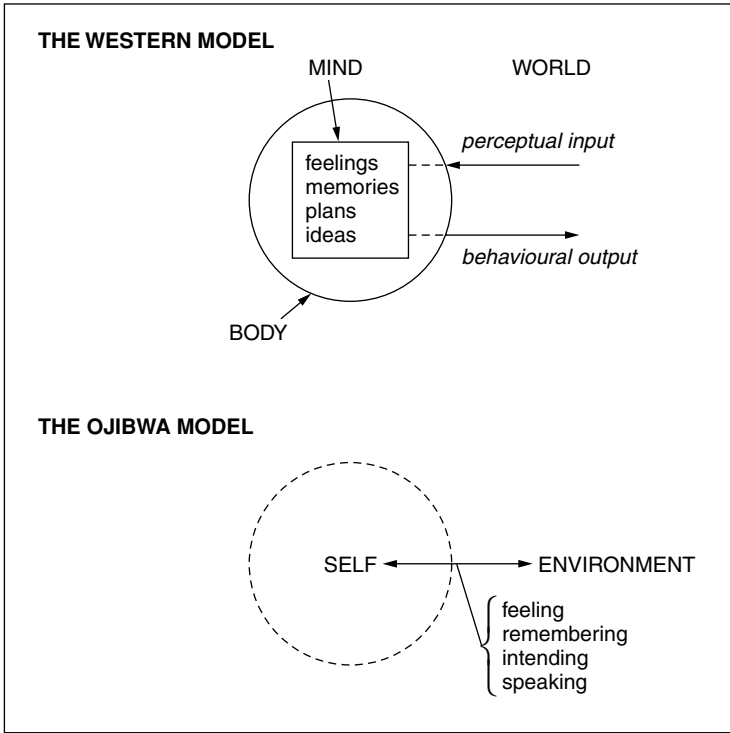
Figure 6.1   Western and Ojibwa models of the person.

the sounds of nature. To take Hallowell at his word means having to adopt a quite different view of speech, not as the outward expression of inner thoughts, but as one of the ways in which the self manifests its presence in the world. Thus when I speak or clap, I myself am not separate from the sound I produce – of my voice or the mutually percussive impact of my hands. These sounds are part of the way I am, they belong to my being as it issues forth into the environment. In other words, speech is not a mode of transmitting information or mental content; it is a way of *being alive.*

Now if we take this view of speech, there is no longer anything so odd about supposing, as the Ojibwa do, that thunder can speak, and that other people can hear. The rumbling of thunder is the manifestation of its presence in the world, just as the sounds of human speaking, singing, clapping or drumming are manifestations of ours. Likewise in 'conjuring performances' (Hallowell 1942, 1976: 459), when the voices of grandfatherly other-than-human persons are heard to issue from the interior of a barrel-shaped tent which is constantly shaken about by their activity, each character makes his presence felt, and is recognised by the audience, on account of the peculiarity of his speech, including features of voice, vocabulary and intonation. Thus the world in which the Ojibwa dwell is polyglot, full of beings with their own diverse styles of speaking or singing.[13] As people move through the forest in hunting, or hear myths being recited, or sit around the outside of the conjuring lodge, they constantly listen out for the sounds that are the signatures of these manifold life-forms, and respond with speech-sounds of their own. Non-human sounds like thunder or animal calls, the voices of other-than-human persons, and the

speech of human beings are alike in that they not only have the power to move those who hear them, but also take their meaning from the contexts in which they are heard. In these respects, no fundamental line of demarcation can be drawn between the sounds of nature and of human speech.

Is there any significance, then, in the fact that the thunder was heard instead of seen? There is a long tradition in the history of Western thought, which I review at length in Chapter Fourteen, of distinguishing between vision and hearing along the lines that the former is remote and objective, cutting the viewer off from things seen, whereas the latter is intimate and subjective, establishing a kind of interpenetration or resonance between the listener and the world. There are some hints, in Hallowell's account, that the Ojibwa might make a similar kind of distinction. Thus he tells us that under no circumstances can the inner essence of the person, the soul, be a direct object of visual perception. 'What can be perceived visually is only that aspect of being that has some form or structure . . . The only sensory mode under which it is possible to directly perceive the presence of souls . . . is the auditory one' (CE, pp. 179–80). This is why the other-than-human persons of the shaking tent ceremony are heard but never seen. So far as the audience is concerned these persons *are* their voices, just as thunder *is* its clap. In both cases sound is of the essence of being rather than its outward expression. However there are counter-indications, too, that Ojibwa might not, or at least not always, make such a radical distinction between seeing and hearing.

One such indication is that ghosts, the outward form of spirits of the dead, can be heard as well as seen. They are known to whistle (CE, p. 174). But more significantly, the notion that vision presents us with a world of objective forms rests upon an assumption that is incompatible with the relational model of the person presented above. This assumption, which is implicit in most studies of visual perception by Western psychologists, is that seeing things involves the formation of images in the mind on the basis of sensory data drawn from the play of light upon the retinal surfaces of the eyes. Now in an earlier section on the meaning of experience for the Ojibwa, I showed that for a being who is alive to its surroundings, experience does not mediate between things in the world and representations in the mind, but is intrinsic to the sensory coupling, in perception and action, of the awareness of the self to the movement of those features of the environment selected as foci of attention. This view of experience calls for a quite different understanding of vision. It would be premised on the notion of the perceiver as an active participant in an environment rather than a passive recipient of stimuli, one whose vision penetrates the world rather than holding up a mirror to it. David Smith, writing of the Chipewyan of the northwest Canadian subarctic, has drawn attention to the importance of precisely this kind of vision to their 'bush sensibility'. The hunter and trapper, making his way through bush or forest, has at all times to *watch what is going on*. Yet as Smith also shows, regarded as a form of dynamic, sensory resonance, seeing does not differ in principle from hearing, and when it comes to people's pragmatic, first-hand experience of moving around in the environment, they are so closely intertwined as to be inseparable (Smith 1998: 413–14, see also Chapter Fourteen, pp. 276–81). I suspect that this is as true for the Ojibwa as it is for the Chipewyan, and therefore that vision and hearing are not, in fact, sharply differentiated in their practice.[14]

Before leaving the topic of hearing and speech, one more issue remains to be dealt with. It arises from Hallowell's remark, apropos the old man's questioning of his wife about the thunder, that 'he was reacting to this sound in the same way as he would respond to a human being, whose words he did not understand' (OO, p. 34). We have

seen that the Ojibwa lifeworld is polyglot, inhabited by manifold beings each with their own particular pattern of speech. It is tempting to compare these different patterns to the diverse languages of human communities, as though understanding the sounds of thunder, the winds, the various forms of animal life, and so on were a problem of translation, of rendering meanings expressed in a multitude of foreign tongues in terms of one's own. Was the old man, then, asking his wife to translate for him? Were the words of the thunder spoken so quickly that, with his imperfect grasp of the language, he failed to grasp what had been said? Now the metaphor of translation implies a certain view of language or speech, as a vehicle for the outward expression of inner ideas. To translate is, then, to 'carry across' an idea encoded in one expressive medium into the terms of another. I have argued, however, that in attributing the power of speech to thunder, Ojibwa do not suppose that it is trying to transmit ideas to humans, but rather that its presence in the world, like that of other beings whether human or other-than-human, can take an acoustic form. Responding to that presence with sensitivity and understanding is not therefore a matter of translation. It is more a matter of empathy.

Consider, for example, the response of a mother to the cry of her baby. Because of the special relationship between them, she *hears* that cry – it is immediately intelligible to her in a way that the cries of other infants are not. To be understood, the cry does not first have to be rendered intelligible through translation into a language that she and others can comprehend. I would suggest that the old man in Hallowell's story may have heard the thunder in the same way. He, too, must have had a special relationship with the Thunder Bird. Indeed in one of his last papers on the Ojibwa, first published in 1966, Hallowell adds a crucial qualification to his earlier interpretation of the story of the old man, the old woman and the thunder. 'By and large', he observes, 'the Ojibwa do not attune themselves to receiving messages every time a thunderstorm occurs'. Thus to understand the old man's response we have to realise that he had had previous contacts with the Thunder Bird in the dreams of his puberty fast (Hallowell 1976: 459). He was therefore sensitised to the sound of thunder in a way that ordinary Ojibwa (including his wife) were not. He could empathise with it. Of course, total empathy is as impossible to achieve as perfect translation. But they proceed in quite different ways. Rather than shifting into another register of expression, the achievement of empathy means taking on another way of being. Full understanding, in short, is attained *not through translation but through metamorphosis*. And this happens, above all, in dreams.

Naturalism and animism

Are the Ojibwa animists? In recent anthropology the concept of animism has had a rather bad press, on account of its liberal use in the past to brand, as primitive superstition, systems of belief which allegedly attribute spirits or souls to things, living or non-living, which to any rational, thinking person are 'obviously' mere objects of nature (for a review of these usages, see Bird-David 1999: S67–8). Philippe Descola, however, suggests a way of considering animism that is rather more respectful of indigenous understandings. Animism, he writes, is 'a kind of objectification of nature [which] endows natural beings not only with human dispositions, granting them the status of persons with human emotions and often the ability to talk, but also with social attributes – a hierarchy of positions, behaviours based on kinship, respect for certain norms of conduct' (Descola 1992: 114). Though Descola draws his ethnographic illustrations from Amazonian societies, this characterisation of what he calls 'animic systems' would seem readily applicable to the

Ojibwa case as depicted in Hallowell's account. Critically, in such a system, relations between persons – that is, *social* relations – can override the boundaries of humanity as a species. Thus, as Hallowell reports, 'the world of personal relations in which the Ojibwa live is a world in which vital social relations transcend those which are maintained with human beings' (OO, p. 43). To this one might add that a person's social relations are carried on in the same space as, and are continuous with, relations with other constituents of their environment, that is with non-persons. There is, then, no radical break between the domains of social and ecological relations.

Following Descola's lead, we might set out to draw a systematic comparison between the animism of peoples like the Ojibwa and the naturalism of Western thought and science. Whereas animism takes the relational character of the world as an ontological *a priori*, against which the 'naturalness' of beings – the material forms in which they appear – stands out as unstable and problematic, naturalism takes it for granted that nature really exists, as an ontological domain of order and necessity where things are what they are, in themselves. Against this world of nature, it is the status and the forms of human culture that appear problematic (Descola 1996a: 88, see also Viveiros de Castro 1998: 478). Yet for Descola, animism and naturalism (along with totemism, consideration of which I reserve for the next chapter) may be regarded as alternative 'schemata of praxis', in other words as 'mental models which organise the social objectivation of non-humans' (1996a: 87). This appeal to the language of mental models, to the idea of accommodating beings that are really non-human into schemes of representation that construct them as social and therefore human, belongs squarely within a naturalist ontology, and it is from this that the terms of the comparison are derived. For what these terms do is to preserve a space for 'really natural' nature which is unaffected by the diverse constructions that the human mind might place upon it. Thus the comparison between naturalism and animism, since it is done on naturalism's terms, is hardly a fair or balanced one (see Chapter Three, pp. 41–2).

My purpose in this chapter has been to redress the balance. Instead of trying to comprehend Ojibwa understandings within a comparative framework which already presupposes the separation of mind and nature, I have been concerned to place the mode of understanding of Western science within the context of the primary existential condition, revealed in Ojibwa thought and practice, of being alive to the world. Let me summarily take stock of these two approaches. The first posits a world 'out there' full of objects, animate and inanimate. The life process of animate objects, being the expression of their essential nature (nowadays understood as their genetic constitution) under given environmental conditions, is understood to be purely consequential, an 'effect' (see Chapter One, p. 19). Hence an additional principle, of mind or consciousness, has to be invoked to account for the powers of intentionality and awareness that we normally attribute to persons. In animic systems such as those of the Ojibwa, these powers are said to be projected onto non-human kinds. So long as we follow Descola in assuming that in reality, they are reserved for human beings, such projection is bound to be anthropomorphic. If, in other words, only humans *really* have intentions, to represent non-humans such as bears *as though* they were persons with intentions is necessarily to represent them as human (see Kennedy 1992: 9). That is why Descola builds a component of anthropomorphism into his very definition of animism, as a system that endows natural beings with human capacities. Only beings thus endowed, it seems, can have social relations.

Working from an Ojibwa notion of animacy, not as an empirical property of things but as an existential condition of being, my argument has followed an alternative path.

This has been to envisage the world from the point of view of a being within it, as a total field of relations whose unfolding is tantamount to the process of life itself. Every being emerges, with its particular form, dispositions and capacities, as a locus of growth – or in Ojibwa terms, as a focus of power – within this field. Mind, then, is not added on to life but is immanent in the intentional engagement, in perception and action, of living beings with the constituents of their environments. Thus the world is not an external domain of objects that I look *at*, or do things *to*, but is rather going on, or undergoing continuous generation, with me and around me. As such primary engagement is a condition of being, it must also be a condition of knowledge, whether or not the knowledge in question is deemed to be 'scientific'. All properly scientific knowledge rests upon observation, but there can be no observation without participation – without the observer's coupling the movement of his or her attention to surrounding currents of activity. Thus the approach I have followed here is not an *alternative* to science, as animism is to naturalism; it rather seeks to restore the practices of science to the contexts of human life in the world. For it is from such contexts that all knowledge grows.

This approach has two further implications that I would like briefly to explore. The first takes us back to the question of anthropomorphism, the second concerns what I shall call the 'genealogical model'. Natural science, as von Bertalanffy has put it (1955: 258–9), approaches the world through a 'progressive de-anthropomorphization', that is, through the attempt to expunge from its notion of reality all that can be put down to human experience. Thus purified, nature is revealed to a detached human reason as a domain of things in themselves. Now Ojibwa ontology, too, could be said to entail a process of de-anthropomorphisation, but this operates in a quite different direction. Instead of severing the link between reality and human experience, Ojibwa ontology recognises the reality of the experience of other-than-human beings.[15] All experience depends on taking up a position in the world, tied to a particular form of life, but for the Ojibwa the human is but one form out of many. This, of course, undermines the core assumption that Descola brings to his characterisation of animic systems as inherently anthropomorphic, namely that experience depends upon powers of awareness and intentionality that mark their possessors as uniquely human.

The genealogical model is a way of thinking about the relations between animate beings which rests on the idea that every such being is specified, in its essential nature, prior to commencing its life in the world. According to the model, the elements of the specification are received as a kind of endowment, passed on independently of the being's interaction with its environment. And it is in the passing on or 'inheritance' of this endowment, from generation to generation, that relations are constituted. I shall consider this model and its implications at length in Chapter Eight. Suffice it to say at this point that the model is central not only to the way modern biology conceives of species and their phylogenetic connections, but also to the conventional anthropological understanding of kinship. Thus a simple line on a kinship diagram indicates that some component of the essence of a person is received, by transmission, at the point of conception, ahead of that person's growth in an environment. Now from the genealogical model, it is easy to derive the following propositions: first, membership of the human – or any other – species is fixed by birth; secondly, the animals most closely related to humans are those (namely the great apes) with which they have the closest genealogical connections; and thirdly, human kinship relations cannot crosscut the species barrier.

From the Ojibwa perspective, none of these propositions is valid. We have seen that beings can change from one species-form to another, that the animals closest to humans

are those such as bears and eagles which are fellow participants in the same life-world, and that one specific category of kin – namely 'grandfathers' – admits persons of both human and other-than-human kinds. Ojibwa ontology, however, is incompatible with the genealogical model at a more fundamental level. For if the forms of beings are not expressed but generated within the life process, then these forms cannot be passed on as part of any context-independent specification. One cannot, in other words, lay down the form that a being will take independently of the circumstances of its life in the world. Kinship, in particular, is not about handing down components of a person-specification, but about the ways in which other persons in my environment, through their presence, their activities and the nurturance they provide, contribute to the process of my own growth and wellbeing. And since these others may be non-human as well as human, there is nothing in the least strange about the extension of kinship relations across the species boundary, nor do we have to set up a distinction between 'real' and 'fictive' kinship in order to accommodate cases of this kind. To receive blessings from my other-than-human grandfathers, it is not necessary to suppose that I am descended from them in the genealogical sense.

CONCLUSION

Ever since Darwin, Western science has cleaved strongly to the view that humans differ from other animals in degree rather than kind. Yet it is a view that has raised more problems than it has solved. For if we ask on what scale these differences of degree are to be measured, it turns out to be one that places human beings unequivocally at the top. It is the scale of the rise of reason, and its gradual triumph over the shackles of instinct. Where Darwin differed from many (though by no means all) of his predecessors was in both attributing powers of reasoning to sub-human animals and recognising the powerful sway of instinct even on the behaviour of humans beings. As he argued in *The Descent of Man* (1871, Chs 3 and 4), the beginnings of reason can be found far down in the scale of nature, but only with the emergence of humanity did it begin to gain the upper hand. In short, for Darwin and his many followers, the evolution of species in nature was also an evolution that progressively liberated the mind from the promptings of innate disposition. Moreover in bringing the rise of science and civilisation within the compass of the same evolutionary process that had made humans out of apes, and apes out of creatures lower in the scale, Darwin was forced to attribute the ascendancy of reason in the West to innate endowment, a conclusion that is utterly unacceptable today. Modern science has responded, by and large, by dissociating the historical process of civilisation from the evolution of the species, thereby compromising the thesis of continuity. Humans are made to appear different in degree, not kind, from their evolutionary antecedents by attributing the movement of history to a process that differs in kind, not degree, from the process of evolution!

I have been searching, in this chapter, for a way of understanding the continuity of the relations between human beings and all the other inhabitants of the earth which does not fall foul of the difficulties of the argument by degree – an argument that is unashamedly anthropocentric in taking human powers of intellect as the measure of all things, that can only comprehend the evolution of species in nature by supposing an evolution of reason that takes them out of it, and that, if applied consistently, is incompatible with any ethical commitment to shared human potential. I have tried to show that the ontology of a non-Western people, the Ojibwa, points the way towards a solution. I do not mean to suggest

for one moment that the Ojibwa orientation to life in the world is without paradoxes of its own. Nor would I wish to argue that it offers a viable substitute for science. Earlier, I suggested that what the Ojibwa have arrived at is not an alternative science of nature but a poetics of dwelling. In the past, there has been a tendency to write off such poetics as the outpourings of a primitive mentality that has been superseded by the rise of the modern scientific worldview. My conclusion, to the contrary, is that scientific activity is always, and necessarily, grounded in a poetics of dwelling. Rather than sweeping it under the carpet, as an embarrassment, I believe this is something worth celebrating, and that doing so will also help us do better science.

Totemism, animism and the depiction of animals

INTRODUCTION

Art, it is often supposed, is one of the hallmarks of humanity. It reveals a capacity, common to all human beings, to disengage consciousness from the current of lived experience, so as to treat that experience as an object of reflection. Such reflection is the work of the imagination, and its products are symbolic representations. In visual art, these representations are expressed in painting, drawing and sculpture. Throughout history, in cultures around the world, non-human animals have always figured as key topics of artistic representation. Indeed from earliest times, human beings seem to have been fascinated by their diverse forms and movements, and to have desired to express this aesthetic appreciation in visual media.

What I have just set out is a fairly conventional view, not only in the academic disciplines of archaeology, anthropology and art history but also, I think, more widely among those of us who have been raised within the conventions of the Western 'art world'. I believe, however, that it is almost entirely false, and in this chapter I want to show why. My argument, in a nutshell, is that it results from the retrojection, onto the entire field of pre-modern or non-Western societies, of notions of humanity and animality, of culture and nature, and of art as representation, that have their source in Western modernity. The field of non-Western 'art' is vast, and obviously I cannot deal with it all. Instead, I shall confine my attention to the paintings, drawings and carvings of certain peoples conventionally known in anthropological literature as 'hunters and gatherers'. This is not the place to debate the validity of the category; the important point for our present purposes is that people who hunt and gather for a subsistence generally have an extremely close and intimate knowledge of the landscape and its plant and animal inhabitants, on whose continuity or regeneration their life depends. They stand, if you will, at the opposite extreme from the affluent Westerner who may find the wild animal a beautiful thing to look at, whether directly or more often through the lens of a camera, so long as it remains at a safe distance which precludes any closer involvement.

In order to avoid the unwanted connotations of the concept of 'art', I shall refer to the animal-like figures that hunter-gatherers draw, paint or carve as 'depictions'. Though far from ideal for the purpose, it is the most neutral term I can find. Obviously, to say of a figure that it depicts an animal is to suggest that it bears some iconic resemblance to the creature in question. It does not necessarily follow, however, that the one *represents* the other (Gibson 1979: 279–80). But if depictions are not representations, what are they? How else are we to interpret the correspondence between the figure and the animal it evokes? The answers to these questions, I argue, depend upon ways of understanding the

relationships between human beings, animals and the land. To show how this is so, I intend to contrast two such understandings, which I denote by the terms 'totemism' and 'animism'. These should be taken as labels of convenience only, and I should move at once to correct the misleading impression to which adding the '-ism' is apt to give rise, namely that the terms refer to coherent and explicitly articulated doctrinal systems. They are, of course, nothing of the sort, but rather orientations that are deeply embedded in everyday practice. Or to put it another way, they are not so much systems *to* which people relate as immanent in their ways of relating.

Furthermore, I have no wish to become embroiled in arguments about the extent to which the diverse beliefs and practices that have been brought under the respective rubrics of totemism and animism share features in common. Suffice it to say that my view of totemism rests largely on my reading of ethnographic material from Australian Aboriginal societies, and my view of animism has its basis in the ethnography of the circumpolar North. Ironically, the word 'totem' actually comes from the language of the Ojibwa, a native people of northern North America whose basic ontology, as we saw in the last chapter, is unquestionably animic. It entered the anthropological literature by way of an account written by the Englishman J. K. Long, who was trading with the Ojibwa towards the end of the eighteenth century, as a label for systems of ritual and belief that associate particular social groups, such as clans, with particular natural species, usually of animals. For various reasons, internal to the history of social anthropology, the *locus classicus* for such systems subsequently shifted from North America to Australia. More recent ethnographic studies of Australian Aboriginal societies showed, however, that the association of clans with species is a corollary of a more fundamental set of linkages between people, land and ancestral beings. Both for ethnographers of the region and for Aboriginal people themselves, it is to these linkages that the concept of totemism has come to refer, and this is the sense in which I will use the term here.[1]

In what follows I begin by spelling out the contrast between totemism and animism, and go on from there to show how first the totemic ontology, and then the animic one, are reflected in the depiction of animals. This, in turn, provides a basis for their systematic comparison. Finally, I return to the orthodox view spelled out in the introductory paragraph in order to show why it is so wrong, and to replace it with a more satisfactory alternative. The activities of hunters and gatherers that lead to the production of what we in the West call 'art' should, I argue, be understood as ways not of representing the world of immediate experience on a higher, more 'symbolic' plane, but of probing more deeply into it and of discovering the significance that lies therein.

Totemism and animism

At the most fundamental level, the contrast is about the relative priority of form and process. With a totemic ontology, the forms life takes are already given, congealed in perpetuity in the features, textures and contours of the land. And it is the land that harbours the vital forces which animate the plants, animals and people it engenders. With an animic ontology, to the contrary, life is itself generative of form. Vital force, far from being petrified in a solid medium, is free-flowing like the wind, and it is on its uninterrupted circulation that the continuity of the living world depends. In the following paragraphs I elaborate on this contrast in more detail.

Throughout Aboriginal Australia, people's sense of being is grounded in the understanding that the fundamentals of existence were laid down in an era known conventionally

as the Dreaming. During this era, which both underwrites the living present and encompasses it as but a moment of eternity, the initially shapeless earth was inhabited by beings of immense scale and power who roamed across its surface, shaping it with the impress of their movements and depositing something of their creative essence at place after place as they passed along. These beings are said to be ancestral to all currently living creatures, whether human or non-human. But the relationship between the ancestors and their living progeny is not a genealogical one. That is to say, there is no line of descent, passing through a series of intermediate steps, that would connect the one to the other, nor is any living generation further removed from the ancestors than its predecessors. For every living being, according to the Aboriginal conception, draws its essential form and substance directly from the land, and the land, in turn, embodies the creative powers of the ancestors. Human beings and other creatures come and go: they emerge from the land, live out their time, and are reincorporated into it when they die. But the land is always there, and will continue to bring forth new life so long as those who dwell upon it – by fulfilling their custodial responsibilities towards it, or 'looking after' it in the proper way – do not allow its powers to be dissipated. It is this understanding of the relationship between the ancestors, the land which is the enduring form of their presence, and the living beings it engenders, that I call 'totemic'.

Among the native peoples of the circumpolar North the land does not have quite the same significance that it has in Aboriginal Australia. For the powers that bring forth life, instead of being concentrated in the land itself, are rather distributed among the manifold beings that inhabit it. There is no power source, analogous to the totemic ancestors of Aboriginal cosmology, that subtends the life process itself. Consequently, animate beings are engendered not by the land but reciprocally, by one another. Far from revealing the shape of a world that already exists, as it were, out of time, life is the temporal process of its ongoing creation. The world of this 'animic' understanding is home to innumerable beings whose presence is manifested in this form or that, each engaged in the project of forging a life in the way peculiar to its kind. But in order to live, every such being must constantly draw upon the vitality of others. A complex network of reciprocal interdependence, based on the give and take of substance, care and vital force – the latter often envisaged as one or several kinds of spirit or soul – extends throughout the cosmos, linking human, animal and all other forms of life. Within this network, the generation of animate form in any one region necessarily entails its dissolution in another. Vitality must be surrendered here so that it may be reconstituted there. For this reason, no form is ever permanent; indeed the transience or ephemerality of form is necessary if the current of life is to keep on flowing. All of existence is suspended in this flow. Borne along in the current, beings meet, merge and split apart again, each taking with them something of the other. Thus life, in the animic ontology, is not an emanation but a generation of being, in a world that is not pre-ordained but incipient, forever on the verge of the actual.

Having set out the basic contrast between totemism and animism, I now want to consider how it bears upon the relation between human beings and non-human animals. How, for example, is it reflected in the attitudes of hunters towards their prey? In a totemic system, to hunt (or to refrain from hunting) animals of a particular species is part of the proper way of living one's life on the land according to a pre-established order of things. Thus the relation between human and animal is subsumed by the relation of both to the ancestral powers of which they are the living incarnations. People of course have to hunt (as well as gather) to secure a livelihood, but the actual pursuit of animals lacks cosmological significance. It is, as Philippe Descola writes, 'a quite mundane activity of

food procurement' (1996: 95). While it helps to keep people fed it does not, in itself, establish their presence in the world. It is in dwelling upon the land – in the senses both of inhabiting it and of sustained focal attention towards its ancestral essence in acts of ceremony – that people forge their sense of being. In an animic system, on the other hand, hunting effects the circulation of vital force between humans and animals and thus contributes directly to the regeneration of the lifeworld of which both are part. The animals offer something of their potentiality and substance to human beings so that the latter may live, while humans, in return, through the proper treatment of the animals in death, ensure the release of their life force and hence their subsequent reincarnation. Human life, which in the totemic ontology is predicated upon the immortality of the land, is here predicated upon the mortality of animals. In the animic ontology, the killing and eating of game is far more than mere provisioning; it is world-renewing.

Let me put the contrast in another way. The totemic world is essential, the animic world dialogical. When an Australian Aboriginal man proclaims himself to be a kangaroo, he means that he – along with other persons who share this affiliation – actually partakes of the same substance as the kangaroo. The connection, in other words, lies in the essential consubstantiality of members of the human group, and of the animal species, all of whom derive the lineaments of their being from the same place in the landscape in which is deposited the creativity of the kangaroo ancestor. But what of the shaman, in a northern circumpolar society, who walks abroad as a bear? Recall that the animic cosmos is populated by beings of both human and non-human kinds engaged in ongoing mutual interaction. Animals, like humans, are supposed to form their own communities, and members of each can visit the communities of the other. From a perspective located within the human community, non-human beings will appear in their animal guise. However upon 'crossing over' to the animal side, a man will see his hosts as creatures like himself, while to the people back home he will now appear in animal form. In short, in the dialogue between human and animal, each in turn takes up the point of view of the other, becoming temporarily other to his or her own people. The shaman, in animic society, is a person of exceptional power, who can move with relative ease across the human–animal interface. But particular animals may also be credited with similar powers: indeed right across the circumpolar North, the bear is regarded as such a one. If the bear can appear human, so too, the human shaman can show up as a bear (see Figure 7.1). Whether you see one or the other depends on where you are looking from; in other words it has to do not with the substance of being but with the relative positioning of self and other in contexts of dialogue.
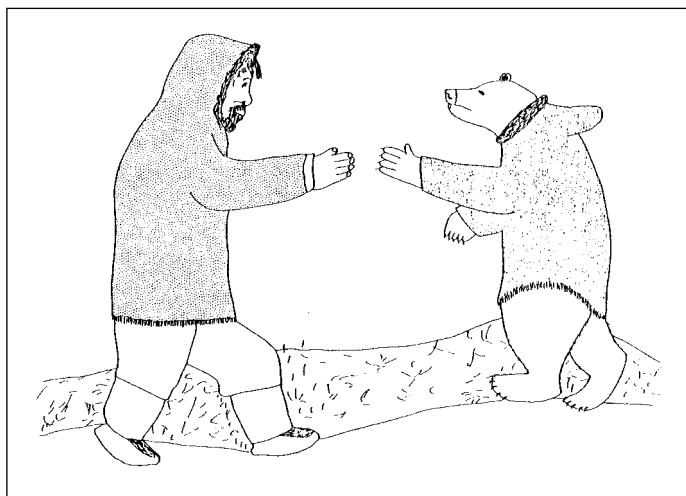
Figure 7.1   An Inuit man and a polar bear cordially greet one another. Drawing by Davidialuk Alasuaq, from the personal collection of Professor Bernard Saladin d'Anglure.

From B. Saladin d'Anglure, Nanook, super-male, *Signifying animals: human meaning in the natural world*, ed. R. Willis, 1990, p. 179.

Now one of the principal reasons why the shamans of animic society make their often arduous journeys to the communities of non-human animals is to recover vitality that may have been lost, due to some untoward circumstance, to the 'other side'. Such loss is generally experienced in the form of serious illness, and by bringing vitality back to the sufferer the shaman aims to effect a cure. Another reason may be to negotiate with the spirit masters, who control the disposition of animals, for their release to human hunters. To make the crossing to the animal domain, the shaman has to avail himself of the assistance of bodies other than his own. Animals of various kinds, known as his 'helpers', carry his inner being aloft on its journey, yet all the while his corporeal body remains where it stands. The shaman's liberation from the constraints of his bodily bearing in the human world is generally achieved through going into trance. In this state, the normal boundaries between human and animal are dissolved. However, such 'out-of-body' experience has no place within a totemic system, for the simple reason that the unity of human and animal, in a totemic ontology, lies in their very consubstantiality. A man does not have to leave his body to take on that of his totem, for his own body and that of his totem share the same essence whose ultimate source, as we have seen, lies in the land. Whereas the animist must go beyond the body to transcend the human-animal distinction, the totemist finds the distinction dissolved at the very core of his being – within the body, not beyond it. Human and animal, separated in life, are reunited on death and burial, that is through the ultimate return of the body to the land from which it grew (see Figure 7.2).

THE DEPICTION OF ANIMALS

Now that we have established the basic contrast between totemic and animic ontologies, our next, and principal problem is to consider how each, in turn, bears upon the depiction of animals. As a lead into the problem, consider the two depictions reproduced in Figures 7.3 and 7.4. The first was executed on bark by the Australian Aboriginal painter Namerredje Guymala, one of a group of Kunwinjku-speaking painters residing in the town of Oenpelli in Western Arnhem Land. It dates from about 1975. The second was drawn on paper around the same time by Davidialuk Alasuaq, an
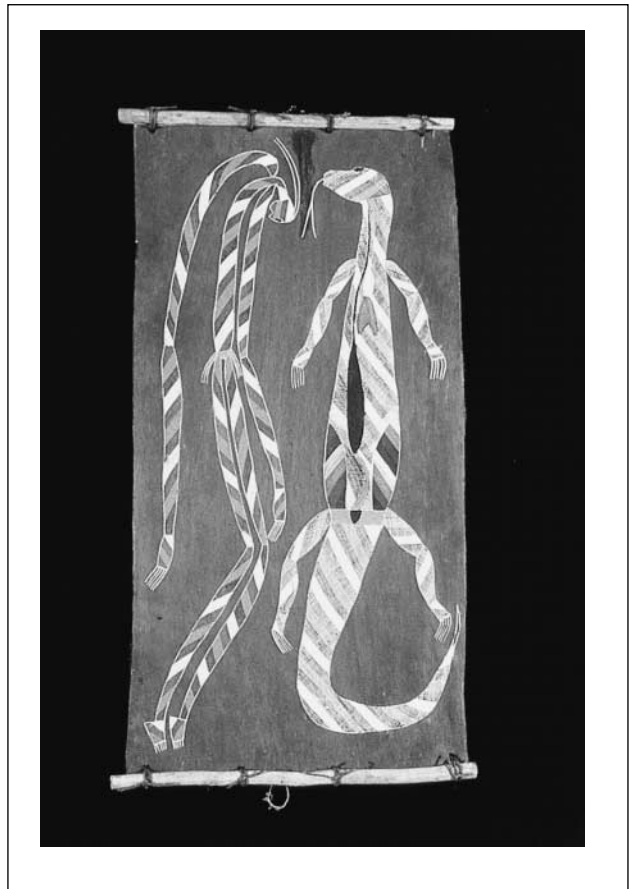
Figure 7.2 This bark painting by Djawada Nadjongorle, a Kunwinjku Aboriginal artist from Western Arnhem Land, Australia, juxtaposes the figures of a dead human spirit and the sand monitor, *Varanus gouldii*. The juxtaposition vividly brings out the unification, in death, of human and animal, joined by their shared ancestral essence.

Figure 7.3 Painting of an antilopine kangaroo with *mimih* spirit, by Namerredje Guymala, c.1975.

Inuit from Povungnituk in northern Quebec. On the face of it, both appear to depict hunting scenes. The animal in Figure 7.3 is an antilopine kangaroo, and in the top right corner is a figure of undoubtedly human form, spear-thrower in hand, on the point of launching a spear towards the head of his victim. The animal in Figure 7.4 is a caribou, which stares directly at the Inuit hunter crouching half-concealed in the under-growth. The hunter is about to loose an arrow from his bow to dispatch the caribou. Now in both pictures, there is actually more going on than immediately meets the eye. The first, as I shall show, is not really a hunting scene at all. The second, though it does indeed describe an encounter between hunter and prey, also catches a moment of reflection in a dialogue between two sentient beings, each of whom is offering something to the other while wondering about the other's intentions. I begin with the former.

Painting the ancestors:
Aboriginal Australia

It is obvious, looking at Figure 7.3, that the depictions of the anthropomorphic hunter and of the kangaroo that he appears to be spearing follow quite different conventions.[2] The hunter is portrayed as a diminutive, stick-like figure, caught in an unstable posture that conveys a powerful sense of movement. He is clearly doing something, using tools, engaging in an activity. The kangaroo, by contrast, does not appear to be doing anything at all. It is depicted in limp, static profile, resembling nothing so much as a perfectly preserved fossil in a slab of stone. Not only is it shown on a much larger scale than is the hunter, but the artist has also chosen to concentrate on the animal's bodily architecture – on its design, morphology and the internal layout of its organs – rather than on the dynamics of movement, posture and behaviour. A particularly remarkable characteristic of the depiction is its use of so-called 'X-ray' style to display the principal features of anatomy, including the heart and lungs, liver, and intestinal tract, as well as the backbone (Taylor 1996: 135–7). Indeed the static, anatomical portrayal of the animal contrasts so strikingly with the dynamic, postural portrayal of the hunter that it seems almost calculated to draw attention to the former's existential status as an *inanimate* being, as opposed to the animacy of the latter. The kangaroo, whatever else it may be supposed to be, is not a living creature.

Figure 7.4 Inuit hunter and caribou. Drawing by Davidialuk Alasuaq, from the personal collection of Professor Bernard Saladin d'Anglure.

From B. Saladin d'Anglure, *Inuit and caribou*, published by Université Laval, Canada, 1979, p. 61.

The figure of the hunter in this painting, though human-like in appearance, in fact depicts a spirit being, one of a class of such beings known as *mimih*. Wispish and delicate but nevertheless agile, *mimih* are believed to inhabit crannies in the rocky escarpment that dominates the landscape of Western Arnhem Land. From their abodes within the rock face they carry on a form of life precisely parallel to that of ordinary living humans, engaging in such activities as hunting, fighting and ceremonials. It was through observing the practices of these spirits that people in the past learned, among other things, how to hunt, to cook, to divide up game in the proper way, and to dance. But above all, *mimih* taught them how to paint. Small red monochrome paintings of *mimih* figures abound on the walls of caves in the escarpment. Many of these, as a matter of fact, are extremely old and are thought by archaeologists to have been produced between nine and eighteen thousand years ago, though the exact dating remains a subject of some controversy. Kunwinjku people, however, assert that the figures were painted by *mimih* themselves, and that they accurately portray both their bodily appearance and their customary activities (Taylor 1996: 89, 183–4).

So much for the figure of the hunter, but what about the figure of the kangaroo? This could be read on two levels. On the one hand the kangaroo is a perfectly ordinary animal, which is hunted and killed for food. Long ago, *mimih* used to hunt kangaroo to eat, as humans do today, and many stories are told of their exceptional skill and prowess in this regard (Carroll 1977: 123–5, Taylor 1996: 134). Yet paradoxically, these stories have virtually nothing to say about the activity of hunting itself, and focus almost exclusively on the procedure for cutting up and cooking the animal once it has been killed. Likewise in depictions of *mimih* hunters apparently spearing kangaroos, such as that in Figure 7.3, neither the behaviour of the animal on encountering the hunter, nor its attitude in death,

is portrayed. It is rather shown as if already dead, and collapsed upon the ground. The area enclosed by the body profile is schematically divided into sections by double parallel lines, which also indicate the way in which the carcass should be cut up for presentation to various categories of kin. The picture can thus be interpreted as a kind of instruction manual, carrying the imprimatur of the *mimih* spirits, for butchery and distribution. In some pictures, the animal is shown already dismembered into several pieces (Carroll 1977: 123). As the distribution of cuts follows the paths of kinship, so the image of the divided animal body provides a kind of scheme or template for the enactment of significant human relationships (Taylor 1996: 199, 225–7). But neither in the pictures nor in the accompanying stories is there a sense of the animal as anything other than mere meat, or of the hunt as an encounter entailing any kind of relationship between one animate being and another.

Read on another level, however, the figure of the kangaroo is a portrayal of no ordinary animal. It depicts, rather, an ancestral being, one of many whose world-shaping activities are recounted in the stories of the Dreaming. The ancestral standing of such beings is usually indicated by means of a 'geometric' internal division of the body area into triangular or rhombic panels which are filled in with fine cross-hatching (Taylor 1996: 139–43). This cross-hatching produces a shimmering effect that is understood as an emanation of the ancestral power immanent in the depiction: the closest equivalent in Western experience, perhaps, is the brilliance of a stained glass window lit up by sunlight.[3] In the painting shown in Figure 7.3 these features are not pronounced, and so it is probably not intended to be interpreted on this level. But many other paintings on the same theme, complete with a *mimih* hunter in the corner, do depict the kangaroo in a vividly 'ancestral' light (Taylor 1996: 23, 180). Once again the animal is portrayed, by contrast to the hunter, as fundamentally inanimate. This does not mean, however, that it is dead rather than alive, as in the first-level reading. Ancestral beings are inanimate in the same way as is the land they energise: their presence *underlies* the cycle of life and death in which the existence of all mortal creatures, both human and animal, is suspended.

Now painting, whether on cave walls or bark shelters, is one of the ways through which the order of the Dreaming is presented to humans. Another way is through their observation of the landscape itself, created as it was through ancestral activity. One can, rather literally, 'follow' the story of creation either by walking about over the landscape and attending to its features, or by similarly roaming with one's eyes across the surface of the picture. It might be suggested, on these grounds, that the painting should be understood as a kind of map of the landscape. Thus the body of the ancestral being, depicted in the form of an animal (the kangaroo), would stand for the landscape in its totality, and its internal divisions to places and the relations between them, and between their respective inhabitants. Yet while there is certainly a correspondence between the form of the painting and the morphology of the landscape, it would not be right to suppose that the one *represents* the other. Rather, both landscape and painting exist on the same ontological level, as alternative ways in which an underlying, ancestral order is *revealed* to human experience (Taylor 1996: 229–32, see Morphy 1991: 221–2, 237). The immobility of the animal in the painting, then, is strictly equivalent to the permanence of the landscape: the movement is entirely on the side of the painter through whose work the form of the ancestral being is gradually unveiled, just as it is on the side of the hunter who makes his way through the terrain.

But likewise in the painting, the movement appears to be wholly on the side of the *mimih* spirit as it clambers over the motionless body of the ancestral creator being. Like

ordinary humans, *mimih* have no creative power of their own but are bound to an already established order of things. And in these spirits living humans see the reflections of themselves. Thus the relation between the *mimih*-figure and the ancestral kangaroo in the painting is precisely analogous both to that between the painter and the world as it is revealed through his work, and to that between the hunter and the landscape over which he roams in pursuit of game. The human painter, depicting the *mimih*, paints his own reflection as it looks back at him from the rock face. It is almost a self-portrait, but not quite, for the human's activity of painting is reflected back as the spirit's activity of hunting. In this the equivalence between hunting and painting, as alternative ways of opening up an ancestral order to visual perception, is perfectly epitomised – though I should stress again that hunting, in Aboriginal understanding, is primarily a kind of movement on the land rather than something you do to, or with, animals. This interpretation, incidentally, immediately makes sense of Kunwinjku assertions to the effect that the original *mimih* paintings were produced by the spirits themselves. But ancestral beings do not paint themselves; they simply *are*, and are revealed in the enduring forms of their creation.

Three further stylistic features of totemic depiction follow from what I have said so far. First, animal-like figures are not generally arranged together to form a narrative scene. For to show such a figure engaged in any kind of activity, on its own or with others, would be fundamentally incompatible with both readings of what it depicts, whether the dead body of a creature that has been hunted and killed or the body of an ancestral being metamorphosed into the landscape. It is true that in some compositions, animal figures appear in symmetrically disposed pairs (Taylor 1996: 164), but this appears to be in the interests of formal balance rather than due to any narrative requirements. Once again, this is in striking contrast to paintings of anthropomorphic *mimih* figures, both ancient and recent, which often show many figures together engaged in a variety of activities (Carroll 1977: 122–5, Taylor 1996: 188). Secondly, the animal is specified, in pictorial form, by a fixed profile or silhouette which itself frames the painting. For what is depicted is not a particular being situated within a world, but rather the world as it is enfolded within a particular being. The bodily limits of the being are therefore the limits of the world. There is nothing beyond. Admittedly, in Figure 7.3 the portrait of the *mimih* spirit lies outside the profile of the animal. But as we have seen this portrait, rather like a signature in the corner of a modern Western work of art, is a projection of the identity of the painter rather than a disclosure of the underlying order of the world, and in this sense is not really part of the picture at all. Thirdly, since there is nothing beyond the body profile, we must look to what is *inside* it – to the relations between its divisions and between these and the whole – to understand the significance of the painting. Where, for example, an ancestral being is credited with the creation of sacred objects to be used in ceremonies, these objects are indicated in paintings as organs internal to the ancestral body in its animal form, rather than as implements in its hands (Taylor 1989: 379–80). Here, too, there is an obvious contrast with depictions of *mimih*, which are often shown brandishing tools and weapons that serve to indicate the activities in which they are engaged (Taylor 1996: 187–9).

In order to reinforce my general argument about the static nature of totemic depictions and their association with the morphology of the landscape, I should like to refer briefly to two other painting traditions from Aboriginal Australia, both very different from that of Western Arnhem Land which has been the focus of my discussion up to now. Among peoples of the desert regions of Central Australia, such as the Walbiri, Pintupi and Luritja, animal forms do not appear at all. What are depicted, in the past by being

drawn or sculpted in the sand, and nowadays painted in acrylic on board, are not ancestral beings themselves but the permanent traces of their activity.[4] A horseshoe-shaped motif, for example, indicates the impression that was left in the ground where the kangaroo ancestor sat down to rest; a pair of parallel wavy lines is the path left in the sand by the ancestral python, and a cluster of small circles are the eggs laid by the ancestral lizard. To each of these motifs there correspond specific features of the landscape: the kangaroo's resting place is a water-hole, the snake's track a creek-bed, the python's eggs a patch of rounded boulders (Layton 1985: 437–8). In sand-drawings and paintings, graphic elements of this kind are linked by connecting lines into a kind of network, and the various routes that can be traced through the network correspond to the paths taken by ancestral beings as they travelled from place to place, creating the landscape as they went.

Now in these depictions from the Australian Central Desert, just as in those from Western Arnhem Land, nothing is going on, or being done. They portray a world that is already made, not one in the making. Yet the two traditions of painting seem to be the exact inverse of one another. In the first we see an unbounded ground, but no animal figures – only 'black holes' corresponding to their enduring imprints in the surface of the earth. In the second we see bounded animal figures, but no ground – there is nothing beyond them. Further reflection, however, shows these to be mutually exclusive alternatives. For to combine figure and ground – that is, to show the animal figures and their imprints in the landscape *together* in the same composition – would at once be to convert it into a narrative scene of the world-in-creation. Suppose, for example, that we were to take a figure depicting the ancestral kangaroo and place it upon a line of horseshoe-motifs to show its track. The effect would be to turn the figure inside out: no longer enfolding the world in its being, the kangaroo ancestor would be portrayed instead as a being in the world, engaged in the activity of journeying from place to place with its characteristic alternation of movement and rest. If, on the other hand, we were to take a depiction of the line of ancestral travel and the impressions left along the way, and add to it an image of the kangaroo-being itself, then the latter would – by its very presence – indicate that the depiction is of a world-shaping journey that is still ongoing rather than over and done with. To portray a world whose formation is complete, the agents of creation have either to be removed from the scene, thus demonstrating that their work is finished, or shown metamorphosed into the forms of their own creation, in which case the world itself becomes one with the immobilised bodies of its creators, each of which incorporates the whole in a particular aspect. The first solution has been adopted by the painters of the Central Desert, the second by those of western Arnhem Land.

Among the peoples of the Western Kimberleys of northwestern Australia, we find yet another solution.[5] In this case the figures in paintings, which are found on the walls of certain caves, are immobile like the landscape because they are actually fused with it. That is to say, they are as tied to the sites in which they occur as are the rock faces that bear them. The principal figures depicted in these paintings are anthropomorphic creator beings known as *Wandjina*. These beings are of bulbous, rotund build, somewhat resembling the human neonate, which gives the impression that they would be incapable of supporting themselves, let alone of autonomous movement. The head is usually surrounded by a broad, halo-like band often divided by lines that radiate outwards. Having neither mouths with which to breathe or sing, nor ears to hear, they are clearly inanimate, while their large round eyes stare vacantly out from the rock face. The *Wandjina* figures are often accompanied by similarly lifeless figures of animal form, depicting the species that they are supposed to have originally brought into being. According to Aboriginal legend, having

shaped the landscape through their activities in the Dreaming, the *Wandjina* eventually came to rest at particular sites where they can still be seen. At these sites, they literally painted themselves into the cave walls. Living humans paint too, of course: thus every clan is responsible for the regular retouching of the *Wandjina* in its own country, in order to keep them in good condition. For if a painting were to fade and disappear, so would the being it depicts, and with it would go the life-giving energy which it imparts to the land. Painting as retouching, in short, is not just a matter of disclosing an already created world, but of conserving or looking after it.

Both in appearance and in status, the *Wandjina* of the Kimberleys are at the opposite end of the scale from the *mimih* of Arnhem Land. *Mimih*, as we have seen, are mobile, and in ancient times they used the walls of caves as convenient surfaces on which to depict their everyday activities in a straightforwardly narrative style, subsequently copied by human beings. But the *Wandjina* did not paint pictures of themselves *on* the rock, they painted themselves *into* it. In the painting, they metamorphosed into their own depictions. *Wandjina* figures, in short, are not depictions *of* anything. Rather, they *are* what they depict, the creator beings themselves, forever immobilised in the rock face. Comparing the *mimih* figures with the animal forms of ancestral beings in the paintings of Western Arnhem Land, we have seen that in the first case depiction is a mode of narration, and in the second a mode of revelation. In the *Wandjina* of the Kimberleys, by contrast, depiction is a mode of being.

Carving the spirits: the circumpolar North

Now let me return to Figure 7.4, and from the totemic ontology of Aboriginal Australia to the very different, animic system of northern circumpolar societies – exemplified in this instance by the Inuit. There is no doubt that the drawing depicts a narrative scene. Critically, it is one in which the animal is just as much a participant as the human hunter. Both are clearly situated in an environment, with a ground surface and scrub vegetation. There is, indeed, a world of difference between the observation of a living animal in its normal environment and the examination of its anatomical form, as though it were laid out before you like a corpse. On a surface reading, this is what distinguishes the figure of the caribou in Davidialuk Alasuaq's picture from Namerredje Guymala's rendering of the kangaroo. The picture is a finely observed portrayal of the characteristic posture and behaviour of the caribou when it encounters the hunter face to face. It is a fact well known both to hunters and to biologists who have set out to study caribou behaviour by scientific methods, that at the point when the animal becomes aware of the close presence of a potential predator, whether human or non-human, it stands still, turning to stare directly at its pursuer (see Chapter One, p. 13). The attitude of the animal at this point, and the tension and suspense of the moment, are beautifully caught in the picture.

From my discussion in Chapter One, it will be recalled that native people have a particular explanation for why the caribou stands its ground. This is the moment, they say, at which the animal intentionally offers itself up to the hunter. This leads us to a deeper reading of the drawing of the caribou in Figure 7.4, which once again contrasts with the 'inside' reading of the figure of the kangaroo in Kunwinjku painting. Recall that the latter reveals a motionless essence, embodied in the land, upon which is founded the life-cycles of ordinary, mortal creatures. The depiction of the caribou, to the contrary, reveals powers of agency, intentionality, and sentience embodied in a living, moving being. On this

reading, the human hunter relates to the animal as one such being to another, and the encounter is a moment in the ongoing dialogue between them. Among hunters who take this view of animals, there is a general feeling that one should not kill an animal that does not consent to be taken. To kill without the animal's active connivance would be an act of violence, carrying the threat of equally violent retribution in the future. How, then, can a hunter know for sure whether an animal means to give itself up or not? This dilemma, a very real one in the experience of Inuit and other northern hunting peoples, is fundamentally what the drawing is about. Let us take a closer look at what is going on.

Like humans, animals reveal their identities and intentions through their behaviour. But the animal in the picture is behaving suspiciously. Specifically, it has a sprig of willow clenched between its jaws. With this, it seems to be trying to say something. But what? Could it be a warning of some kind? The hunter does not know for sure. Uncertain about the caribou's intentions towards him he turns his eyes away from its gaze, and does not shoot. Another picture by Davidialuk Alasuaq, reproduced in Figure 7.5, shows what could have happened had he done so. Here the arrow has already penetrated the body of the caribou, whose forelegs are giving way in a posture that vividly portrays its imminent death. But look at the faces of the hunter and his prey! The man stares at us with an expression of wide-eyed terror. As for the animal, the skin and fur covering of its head has been pulled back to reveal a wolf-like visage, with round eyes, a long, thin snout and bared fangs. The gentle caribou has turned into a frightening predator, and we are left wondering who, in fact, is hunting whom.[6]

Now animals that appear thus, with the head covering removed or retracted, are known as 'hoodless' (*nasaittuq*).[7] Generally, they are individuals that have been maltreated in one way or another by humans in the past, and therefore harbour some malice towards them. I have already shown how, in an animic system, the regeneration of the lifeworld depends
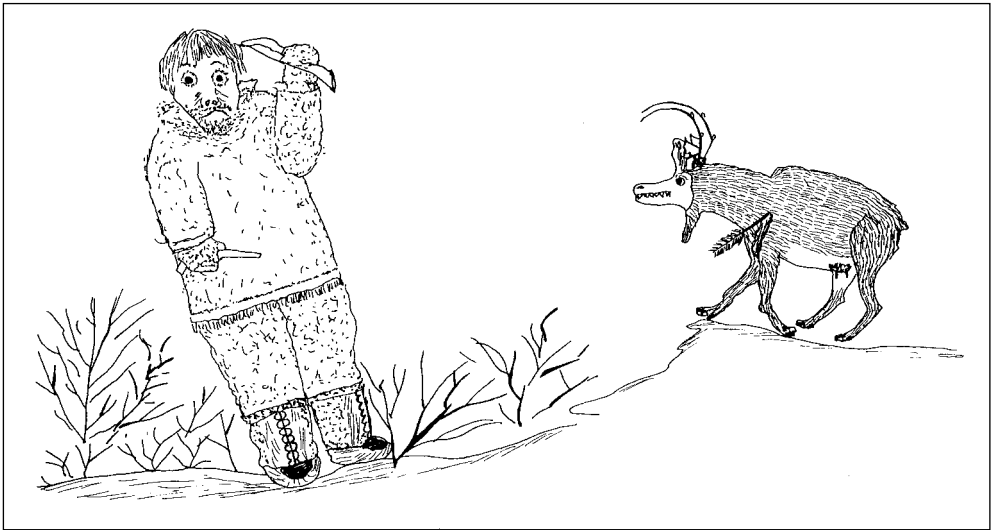
Figure 7.5 On killing a hoodless caribou. Drawing by Davidialuk Alasuaq, from the personal collection of Professor Bernard Saladin d'Anglure.

From B. Saladin d'Anglure, *Inuit and caribou*, published by Université Laval, Canada, 1979, p. 63.

upon the maintenance of balance in the reciprocal give-and-take of vital force. Animals give life to humans, but humans should receive only what is offered rather than seek to extract vitality by forcible or violent means. For otherwise the animals, seeking equally violent recompense, would be turned from life-givers to life-takers. This is precisely what has happened in the case of the hoodless caribou depicted in Figure 7.5. Significantly *nasaittuq*, if killed, are deemed to be inedible: as potential eaters of human beings they cannot be eaten *by* humans – not, at least, without courting considerable danger.

However the image of the retractable hood tells us something more, about the way in which living beings are generally thought to be constituted in animic systems. Despite considerable variation in the detail, a fundamental division is always recognised into two parts: an interior, vital part that is the source of all awareness, memory, intention and feeling, and an exterior, bodily covering that provides the equipment and confers the powers that are necessary to conduct a particular form of life.[8] The first is continuous through time, the second is inherently unstable. Creatures of the sea, for example, can exchange fins and flippers for the armature of a terrestrial quadruped, or vice versa: whales, say the Yup'ik of Alaska, can turn into wolves (Fienup-Riordan 1994: 74–5), but behind the altered bodily form and lifestyle lies a continuity of being. Now for animals in their own communities, as for humans in theirs, the body is transparent. Beings perceive and interact with one another directly, wearing their feelings and intentions, so to speak, 'on the surface', and above all – as we shall see – on the face. However it is not ordinarily possible for a human being to perceive a living animal in this way: its true face remains concealed behind the bodily covering. To witness it 'face-to-face', with its hood removed, one must already have crossed over from the human to the animal domain. Indeed a common theme of stories all around the circumpolar North is of how a traveller, having lost his or her bearings in the human world, strays or is lured into the abode of a certain animal, whereupon the latter stands revealed in its inner being. For the traveller, this is a dangerous, indeed potentially fatal predicament. One may never make it back to the company of humankind. Small wonder, then, that the hunter depicted in Figure 7.5 looks scared. For not only does the hoodless caribou, its predatory intentions revealed, pose a direct threat to life and limb, but also the very sight of it casts a pall of uncertainty over his existential status as a human being.

In short, the faces of animals are visible only to humans who have taken up the subject positions of the animals themselves, and who have therefore – in the eyes of other humans – actually *turned into* animals. Only shamans have the power to do this intentionally and with relative impunity. Human beings can, however, invoke the presence of animals in their midst by means of masks. Here, in effect, it is the animal, whose inner being or spirit is revealed on the surface of the mask, which takes up the subject position of a human, namely that occupied by the mask-bearer. The carving of wooden masks depicting the faces of animals and other non-humans, for display in dances and ceremonies, is widespread among the indigenous peoples of the circumpolar North. In some regions, such as among Inuit and Yup'ik people of Alaska, and on the American northwest coast, the construction of masks reached quite extraordinary degrees of elaboration. This is not the place for a detailed analysis of their symbolic content.[9] I want merely to make three general observations about the depiction of animals in masks. First, the central component of every mask, around which all else revolves, is a face. Secondly, the mask is not a disguise intended to hide the identity of the bearer. Thirdly, in appearance, the masks often show little obvious resemblance to the animals whose spirits they are supposed to depict.

As a surface, the face has some very peculiar properties. I can feel my own face, and others can see it. But it remains invisible to me. Where others see my face, I see the world. Thus the face is the visible appearance, in others' eyes, of my own subjective presence as an agent of perception. It is, if you will, the *look* of human being. By the same token, the face-depicting mask is the look of non-human being. Both face and mask are the phenomenal forms of 'the Other as Subject', that is, as the 'second person' whom one would address as 'you' and who would respond in kind (Viveiros de Castro 1998: 483). Now when the hunter in Figure 7.5 witnessed the caribou with its hood drawn back, what he saw was the animal's real face. However, far from its having been unmasked, as a conventional understanding of masking as disguise or cover-up would lead us to expect, *the mask was what was revealed*. In other words, the mask is not the skin and fur of the hood but the face itself. As visible manifestations of inner being, face and mask are ontologically equivalent. Thus a being can no more look through a mask than it can look through its own face. There is no face peering out from behind the mask. In effect the identity of the human mask-bearer is not so much disguised as displaced by the mask he carries. For this reason, in masked dances the eyes of the bearers should be downcast – rendered passive in order to make way for the active perceptual powers of the mask (Fienup-Riordan 1987).[10]

Moreover, precisely because the mask's purpose is to reveal the true, or spirit face of the animal rather than to conceal that of its human bearer behind an animal disguise, its appearance is nothing like the animal's facial covering. The standard features of the mask-face include eyes, mouth and nostrils. On perceiving these features we are inclined to regard the face as human, or at least human-like, in appearance, and there is some evidence that native people did the same, thus supposing that animal spirits are human in form (Oosten 1992: 115–16). Yet the faces on many masks are so grotesquely distorted that they bear no more resemblance to the human visage than to that of any other creature, and mask-makers were certainly not constrained by any conventions of realism. Their aim, it seems, was not to depict any attributes of morphology or behaviour that might be drawn from empirical observation of the animal in question, but rather to capture the underlying character and personal idiosyncrasies attributed to the spirit that has assumed its form. This was done by inflecting the curve of the mouth, the splay of the nostrils or the slant of the eyes in recognisable ways. Some masks have hinged flaps of outwardly naturalistic appearance, but these are designed to open up so as to disclose the face, effecting a transformation precisely equivalent to the caribou's removal of its hood. Other masks achieve the same effect through visual punning or figure–ground reversal: thus a whale's-tail mask looks realistic enough when viewed from one angle, but from another the contours of the tail turn out to reveal a mouth, nose and browridges (Ray 1967: 212 and Plate 52, Oosten 1992: 128–9, see also Carpenter 1966: 224).

It is in the matter of clothing, not masks, that considerations of animals' diverse bodily forms, and of the behavioural capacities that go along with them, come to the fore. Circumpolar hunters attach great importance to clothing, dressing up in the skins and furs of the animals they have killed. Of course they have to keep warm, but there is more to it than that. We have seen that animals' bodily covering is understood as so much equipment which enables them to lead the kinds of lives they do. Human beings differ from other animals in that they are born naked, without any covering. To survive, they must clothe themselves with animal bodies, and in so doing, they can also draw on the effectivities these bodies confer (see Chapter Six, p. 94). Very often, parts of the animal skin would be tailored to cover corresponding parts of the human body: thus the skin of

the head would be made into a hood, that of the legs into trousers and boots, and so on (Chaussonnet 1988: 213). In short, whereas animals take body-skin *off* to reveal themselves in their inner being, humans put it *on* in order to function in the world.[11] This is the difference between the bear and the man in Figure 7.1. The man wears a coat, leaving his face and hands uncovered. The bear, however, has uncovered his face and hands by peeling back the skin. The one, in a sense, dresses up, the other dresses down. Dressing in skin clothing, however, is very different from wearing a mask. For the mask is distinguished from clothing precisely as the inner being of the animal is distinguished from its exterior body. Dressed in its skin, the human acquires the effectivities of the animal; donning the mask, the human makes way for the spirit of the animal.

Before leaving the subject of masks, I should like to comment on a curious feature of masks from the Kuskokwim-Yukon area of Alaska. One such is illustrated in Figure 7.6A. This is an example of the type of mask referred to above, with hinged doors that open to reveal a face. Painted on the inside surface of each door are quite realistic, silhouette depictions of seals (on the left) and caribou (on the right). Now the mask-face belongs to a *tunghak*, one of the spirit 'masters' or keepers of game animals. Evidently, the *tunghak* has its charges in mind, since even with the shutters closed the seal and caribou figures dance before its eyes. Now it is often said in these parts that a hunter, if he is to succeed, should likewise keep the animals he will pursue at the forefront of his thoughts. Thinking of animals is one of the ways of keeping up a proper relationship with them; conversely the animals, if well regarded, will think positively of humans. Yup'ik hunters, according
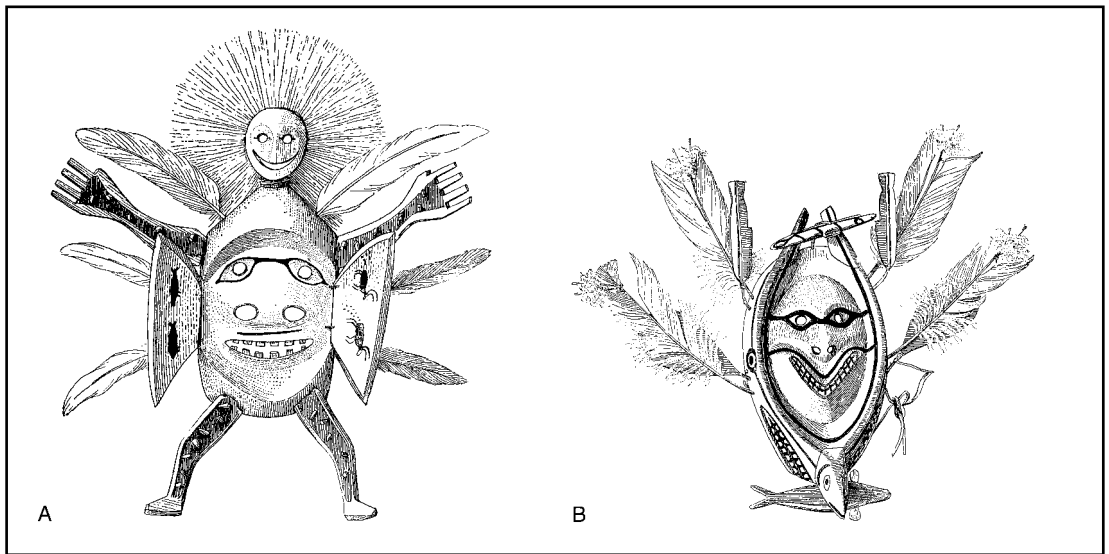
Figure 7.6   Two masks from the Kuskokwim-Yukon area of Alaska, from Nelson (1983 [1896–7]: Plates 50 and 51). The first (A) depicts a spirit master of the animals (*tunghak*). According to Nelson (1983: 406) the animal figures on the inside left shutter are seals; Ray, however, claims they are whales (1967: 65). A colour photograph of the same mask appears in Fitzhugh (1988: 306 fig. 435), but in this the figures on the left appear too worn to be identified with certainty. The second mask (B) depicts a salmon, with its back cut away to reveal the face of the salmon's *inua*, or spirit.

From E. W. Nelson, *The Eskimo about Bering Strait*, published by Smithsonian Institution Press, 1983, p. 408.

to Fienup-Riordan, 'admonished young men to "keep the thought of seals" foremost in their minds as they shoveled snow, carried out trash, and hauled water' (1994: 53). So whatever he is doing, whether actually out hunting or engaged in routine domestic chores, the animals should always be there before a man's mind's eye. Hunters, as we might say, typically have animals 'on the brain'. In the extraordinary, bird-like hunting helmets traditionally worn by the Aleut, adorned with exquisitely lifelike animal figurines carved from ivory, and sometimes painted with narrative depictions of hunting scenes as well, this became almost literally true (Rousselot, Fitzhugh and Crowell 1988: 152, 164–5). But the carving of realistic animal figurines is a practice of truly circumpolar distribution, and – besides the significance attached to masks and clothing – is probably one of the most distinctive features of animic depiction. I would like to conclude this section with a few words about it.

In my analysis of the animal depictions of Western Arnhem Land, I showed how the activity of painting can be compared, in a certain sense, to that of hunting. In the circumpolar North there is a similar parallel between carving and hunting. Yet the similarity hides a contrast, for in the experience of the carver, hunting is not so much a movement through the terrain as a mode of relating to animals. The important thing in hunting is never to impose one's will upon animals, to force them against their inclinations. When it is ready, but not before, the animal reveals itself to the hunter, who can then gracefully receive its gift of bodily substance. In just the same way, carving is not the wilful imposition of preconceived form on brute matter, but a process in which the carver is continually responsive to the intrinsic qualities of the material, to how it wants to be. The following passage, in which Edmund Carpenter describes an Inuit carver at work, could almost have been written of the hunter on the ice:

> As the carver holds the unworked ivory lightly in his hand, turning it this way and that, he whispers, 'Who are you? Who hides there?' And then: 'Ah, Seal!' . . . Then he brings it out: seal, hidden, emerges. It was always there: He did not create it. He released it: he helped it step forth.
>
> (1966: 206)

If painting, for the people of Western Arnhem Land, is a way of focusing attention on the land and its immanent ancestral powers, then carving for the Inuit and other peoples of the North is a way of keeping animals in mind. Moreover it is the process – of dwelling on the animals in one's thought – that is important, rather more than the products – the carvings themselves – which are readily lost or discarded (Carpenter 1966: 212).

This interpretation helps us to make sense of two outstanding features of carved animal figurines: their minute size and their realism (Figure 7.7). Among carvings from the so-called Dorset Culture, dating to as early as 800 BC, Carpenter notes that one – of a ptarmigan – 'is scarcely larger than the head of a match', another – of a running bear, complete with claws – 'is less than three-eighths of an inch high', and a third – of a glaucous gull – 'weighs less than one-sixtieth of an ounce'. Yet each was so accurate that there could be no doubt about the species depicted (1966: 218). These tiny objects are the material embodiments of thoughts, or more strictly they *are* thoughts. For the carver would not separate thinking in the head from thinking with the hands, nor, consequently, would he distinguish the products of these respective activities. But as embodied thoughts, carvings are of such a microcosmic scale that they can be turned around in the hand as can images in the mind. They are not designed to be set upon a pedestal and looked at,

indeed most will not stand up unless artificially mounted. Rather, like memories, they are held close to the person – generally fastened to the clothing – and are carried around with that person wherever he or she goes. Indeed the relation between the hunter and the miniature figurines he carries is precisely analogous to that between the *tunghak* depicted in the mask shown in Figure 7.6A and the tiny animal figures painted on its inside doors. Both the mask-spirit who has seals and caribou to bestow, and the hunter who has hopes of receiving them, have animals in mind.

These little animals are like tokens in the ongoing relationship of give and take between human hunters and the spirit beings on whose continued generosity the supply of game depends. They are, in that sense, equivalent to the animals actually killed in the hunt, and this accounts for the realism of their depiction. Equally lifelike figures are frequently carved on hunting and other equipment: knife-handles, harpoon heads, toggles, lamps, bowls and containers, and sundry other items could all be ornamented in this way. As Fitzhugh explains, throughout northern North America (and for that matter, in the Eurasian North as well), 'hunting art, the ornamentation of weapons, and the use of ritual hunting clothing were the hunter's way of asking for the gift of an animal rather than overpowering it physically or spiritually' (1988: 310–11). It should come as no surprise, then, that among Australian Aboriginal hunter-gatherers, who have no such reciprocal ties with animal-donors, the ornamentation of equipment is conspicuously absent. Indeed in the relation between the ancestral beings of Western Arnhem Land and the tiny *mimih* spirits we find the precise inverse of the relation, among northern circumpolar hunters, between human or spirit beings and the little animal tokens that they carry. Where the human-like *mimih* adheres to the much larger body of the zoomorphic ancestral being, the carved animal figurine adheres to the clothing of the hunter, and the painted animal silhouette to the mask of the spirit.

SOME MORE COMPARISONS

I have shown that perhaps the most fundamental contrast between the totemic and animic depiction of animals is between a
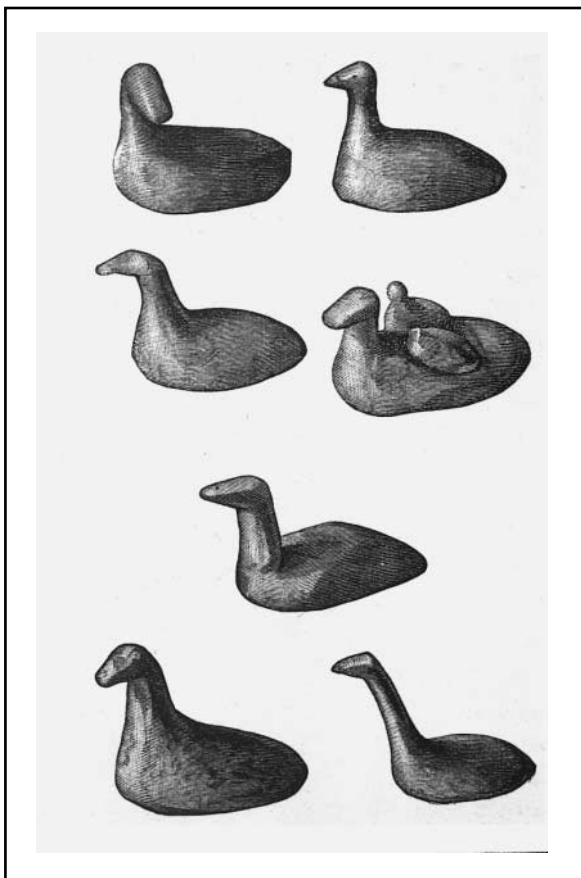
Figure 7.7 Miniature waterfowl carved in walrus ivory by Inuit of the Ungava District, northern Quebec; from Turner (1979 [1889–90]: 96 fig. 63). The species depicted include loons, eider ducks, geese, sea pigeons, and guillemots. Turner writes: 'It is readily discerned, in most instances, what position and action of the bird was intended to be represented. The last shows in the plainest possible manner that the loon is just starting to swim from an object which has given it alarm'.

From L. M. Turner, *Ethnology of the Ungava District*, published by Presses Coméditex, Quebec, 1979.

focus on morphology and anatomy in the former, and on posture, movement and behaviour in the latter. It would be a mistake to infer from this, however, that in totemic society, people know and experience the land, and the ancestral beings that shaped it, only by their final immobile forms. And it would be equally mistaken to infer that in animic society, animals and other non-human beings are known and experienced only by way of their mobility. After all, the animal spirit whose face is carved on a mask is no more shown to be 'doing something' than is the ancestral being whose profile is painted on rock or bark. Neither the painting nor the mask *depicts* movement. The difference between them, however, is that in totemic depiction the significant movement lies in the process of painting itself, whereas in animic depiction it is imparted to the finished object, the mask.

In their ceremonies Australian Aboriginal people re-enact, through song, dance and storytelling, the events of ancestral world-creation. Dance steps, in particular, mime the original movements of the ancestral beings, and are closely modelled on the characteristic postures and gestures of the animals whose forms they take. In storytelling, the narrator may move a finger across the sand in imitation of the movement of the ancestral hero of the story, leaving a trace that has its counterpart in the landscape which the hero shaped in its journey. Now like dancing and storytelling, painting, too, is a performance. The movement of painting is congealed in the depiction just as that of the storyteller is congealed in the traces of his gestures in the sand, or that of the dancers in the imprint of their feet upon the earth. But the analogy is between painting, dancing and storytelling, not between paintings, dances and stories. The painter does not, in his picture, seek to portray the actions of ancestral beings, as do dancers in their steps and storytellers in their words. But like them, he seeks to re-enact ancestral activity – to 'go over' it again and again, quite literally in the case of retouching – in the very movement of his work. Thus while painting *is* an activity, paintings do not *depict* activity.

Carving, of course, is an activity too. But among Inuit and Yup'ik of Alaska, where the making of masks was most highly elaborated, the carving itself was rather quickly and furtively done so, it was said, as not to offend the spirits depicted (Ray 1967: 52). A shaman who had experienced a vision of the spirit in question would often commission an expert carver to do the work for him, according to his instructions. Once completed, the mask would be hidden away, only to be revealed in the ceremony for which it was intended. Here, borne aloft by a dancer and animated by his movements, the mask would come to life, to be witnessed by the audience as a being in their midst. Thus while the Yup'ik or Inuit mask of an animal spirit, in itself, no more depicts activity than does the Australian Aboriginal painting of a totemic ancestor, the former is perceived as a dynamic, mobile presence whereas the latter is perceived as a static locus of congealed power. This difference maps directly onto the basic distinction between totemic and animic ontologies with which I began. It therefore furnishes an explanation for the remarkable ethnographic fact that masks, which are such a striking feature of the animic societies of the circumpolar North, are conspicuously absent from the totemic societies of Aboriginal Australia.

In preparation for dances and ceremonies, however, Australian Aboriginal people do apply painted designs to their own bodies, and it is perhaps to these, rather than to paintings on external surfaces, that the masks of northern circumpolar societies should be compared. Among the Kunwinjku of Western Arnhem Land, the painted body bears the same pattern, consisting of a division into panels filled in with cross-hatching, that is also applied to painted depictions of ancestral beings in their animal forms, thereby

establishing the essential consubstantiality of the two (Taylor 1996: 118–19). Thus decorated, a ritual participant becomes the living embodiment of the being whose distinctive pattern he or she bears. So too, the Inuit masked dancer takes on the *persona* of the spirit-being whose face is depicted on the mask he carries. But the similarity hides a crucial contrast. In the masked dance one being, the spirit, takes the place of another, the dancer. In Aboriginal ceremony, to the contrary, the identities of participants merge with those of the beings whose deeds they enact. The mask, in short, effects a displacement, whereas the body painting effects a reincorporation. The one asserts a metaphorical relation of formal substitution, the other a metonymical link of substantial identity.

Almost exactly the same contrast was suggested by Andrew and Marilyn Strathern, in a comparison of modes of self-decoration in the Mount Hagen area with those of the Sepik River and elsewhere in Papua New Guinea. Sepik peoples carve elaborate figures and masks, the people of Hagen do not:

> The process of decoration in Hagen is not representational but metonymical: that is, when Hageners wish to associate themselves with magically powerful things, such as birds, they do not construct masks, carvings or paintings of these. Instead they actually take the *parts* of the birds, their feathers, and attach these to themselves as decorations.
>
> (Strathern and Strathern 1971: 176–7)

Likewise, Australian Aboriginal body decoration enhances the power and vitality of humans through direct contact with ancestral substance, whereas the carved masks of northern circumpolar peoples invoke the presence of non-human sources of power, namely animal spirits, with which humans must perforce transact in order to keep vitality in circulation. In this connection it is significant that disposable parts of animals such as feathers, down and hair, which are used for decoration in both traditions, are attached directly to the body in Aboriginal Australia, but are invariably attached to masks in the circumpolar North.

While body painting can be contrasted along one dimension with masks, along another it can be contrasted with clothing. For northern circumpolar hunters, as we have seen, the body is conceived as a covering that provides the wherewithal to conduct a certain form of life. By 'dressing up' in the bodies of animals, humans can draw on the practical effectivities they confer. Painting the body, however, is quite different from clothing it, for rather than surrounding it with an envelope of capacities, painting serves to bring out, or render visible, its inner constitution. This contrast, in turn, enables us to explain the difference between two quite distinct styles of so-called 'X-ray' depiction. Kunwinjku painters, as we have seen, concentrate on the *insides* of the animal body: its internal parts and organs and their positioning in relation to one another (see Figure 7.3). In the northern style, on the other hand, the X-ray view always reveals what is *inside* the body – its spiritual inhabitant – invariably manifested as a face. An example is shown in Figure 7.6B, another mask from the Kuskokwim-Yukon region of Alaska. The mask portrays the body of the salmon in a somewhat flattened form, but the back has been cut away to reveal the facial features of the salmon's spirit. Quite unlike the totemic style of X-ray depiction, exemplified by Kunwinjku painting, in which the emphasis is on the body's enduring essence, its *bones*; in the animic style of the Yup'ik the body figures as a *skin* that enclothes its spiritual inhabitant. The former style is no more interested in the face than is the latter with the details of internal skeletal architecture.

Finally, there is a contrast to be drawn between painting and carving as techniques of depiction. Australian Aboriginal people were traditionally skilled carvers, yet with the exception of some crude specimens intended for the tourist market (Layton 1992a: 151–2), they did not carve animal figures. Northern circumpolar people, conversely, knew very well how to paint, and they applied paint to – among other things – their carved masks. But painted depictions of animals or other beings are remarkably rare. I would like to suggest that the difference between painting and carving might be related to that between the totemic focus on the land and the animic focus on its living inhabitants. This suggestion is admittedly speculative, and doubtless calls for a good deal of qualification and refinement. Nevertheless, the parallel between painting, as a movement that 'goes over' and transforms a surface, and the movement of ancestral beings going over and transforming the surface of the earth, seems more than coincidental. Likewise, there is a remarkable affinity between carving, as a way of bringing out the form immanent in a lump of material, be it ivory, wood or stone, and the animic understanding of being as immanent within the manifold appearances of the lifeworld. I have shown, moreover, that while painting is akin to hunting in the totemic context, where to hunt is to make one's way over the land, carving is akin to hunting in the animic context, where to hunt is to engage in a dialogue with its non-human inhabitants.

Conclusion

Up to now I have been concerned with the differences between totemic and animic depiction. To conclude, it is time to turn to what they have in common. This is most easily expressed in terms of what they are *not*. In a word, they are not representational. Neither in their painting nor in their carving do people seek to reconstruct the material world they know, through their mundane subsistence pursuits of hunting and gathering, on a higher plane of cultural or symbolic meaning. Whether their primary concern be with the land or its non-human inhabitants, their purpose is not to represent but to reveal, to penetrate beneath the surface of things so as to reach deeper levels of knowledge and understanding. It is at these levels that meaning is to be found. There is no division, here, between 'ecology' and 'art', as though hunting were merely a matter of organic provisioning and carving or painting gave vent to the free play of the symbolic imagination. This division, along with the dualism of nature and culture on which it rests, is of modern provenance, and it lies behind the conventional notion of the work of art as proof of a uniquely human capacity for creative thought and expression.

It is commonly believed that art, like language, is a species universal whose evolutionary emergence marked the advent of humanity itself. This belief, however, belongs to a Western myth of origin which, like all such myths, does more to legitimate the present than shed light on the past. Projecting onto our hunter-gatherer forbears the capacities for everything we most value in contemporary civilisation, the entire course of history – including the history of art – is revealed as the glorious but pre-ordained movement of their progressive fulfilment.[12] The famous paintings of Lascaux or Chauvet surprise us because they seem better than they ought to be at such an early epoch, but we never doubt that they are art. Of course we know nothing about how the people who painted these pictures, some 30,000 years ago, felt about animals, ancestors and the land. It is, however, extremely unlikely that they subscribed to the hierarchical ranking of humanity over nature that leads contemporary Western observers to celebrate their achievement as the high point of artistic development in prehistory. Such ranking would certainly

have been utterly inconceivable within the totemic and animic ontologies that I have discussed here.

To be sure, hunters and gatherers have been painting and carving figures of one kind or another for thousands of years. But only in recent times, now that their paintings and carvings have entered the Western 'art world' – where they attract curiosity, admiration and sometimes high prices – have these people begun to engage in the production of art in the conventional art-world sense of objects for sale or for display in museums and galleries. Hunters and gatherers of the past were painting and carving, but they were not 'producing art'. To understand the original significance of what they were doing, I contend, we must cease thinking of painting and carving as modalities of the production of art, and view art instead as one rather peculiar, and historically very specific objectification of the activities of painting and carving. We are right to admire the skills of Australian Aboriginal painters, and of Inuit and Yup'ik carvers. Like all skills, they are acquired through practice and training within an environment. They are not, however, culturally specific dialects of a naturally evolved, and developmentally preconstituted 'capacity for art'. The existence of such a capacity is a figment of the Western imagination.

Ancestry, generation, substance, memory, land

INTRODUCTION

'Indigenous or aboriginal peoples', according to a recent United Nations document, 'are so-called because they were living on their lands before settlers came from elsewhere' (United Nations 1997: 3). At the time of colonisation, they were the original inhabitants. This is no guarantee, of course, that their forbears had not, during some earlier wave of population movement, displaced a yet earlier people, nor is it to deny that people of settler origin might develop deep and lasting attachments to the land. But these possibilities raise some awkward questions. Does not the conflation of the two terms, indigenous and aboriginal, merely perpetuate a thoroughly Eurocentric image of the precolonial world as a mosaic of cultures and territories that was already fixed in perpetuity before history began? And is it reasonable to withhold indigenous status from persons who were born and raised in a country, among people who likewise have a lifelong familiarity with it, on no other grounds than that many generations previously, their ancestors had arrived from somewhere else?[1] Behind both questions is a more fundamental issue about what it actually means to be an 'original inhabitant'. Suppose – as is widely the case – that the people who were already living on the land when the settlers arrived are no longer alive today. On what grounds can contemporary generations partake of the 'originality' of their predecessors?

In the official organs of the United Nations and the International Labour Organisation (ILO), this question is answered in terms of *descent*. Thus the document cited above goes on to explain, in the same passage, that indigenous peoples 'are the descendants – according to one definition – of those who inhabited a country or a geographical region at the time when people of different cultures or ethnic origins arrived'.[2] This answer, however, introduces paradoxes of its own. For the descendants of these prior inhabitants of the country need no longer live there. Indeed in many cases a substantial majority do not. The very idea that originality can be passed on by descent, along chains of genealogical connection, seems to imply that it is a property of persons that can be transmitted, rather like a legacy or endowment, independently of their habitation of the land. On the other hand, this very habitation is claimed as the root source of aboriginal identity. How, then, can an identity that lies in people's belonging to the land reappear as a property that belongs to them? There is a profound contradiction here, which it is my purpose in this article to explore. It turns, as I shall argue, on the interpretation of five terms that have been central to the debate on indigenous peoples, as conducted by academics, policy-makers and representative organisations of the peoples themselves. They are: ancestry, generation, substance, memory and land.

I aim to show that the meanings of these terms are linked, within this debate, by way of their common grounding in what I shall call the 'genealogical model'. I begin by spelling out this model, and the assumptions it entails: that original ancestry lies at the point where history rises from an ahistorical substrate of 'nature'; that the generation of persons involves the transmission of biogenetic substance prior to their life in the world; that ancestral experience can be passed on as the stuff of cultural memory, enshrined in language and tradition; and that the land is merely a surface to be occupied, serving to support its inhabitants rather than to bring them into being. I go on to argue that the genealogical model fundamentally misrepresents the ways in which the peoples whom *we* class as indigenous – that is, who are regarded as such from a sympathetic, anthropologically informed perspective – actually constitute their identity, knowledgeability, and the environments in which they live. I suggest an alternative, *relational* approach to interpreting the five key terms which is more consonant with these people's lived experience of inhabiting the land. In this approach, both cultural knowledge and bodily substance are seen to undergo continuous generation in the context of an ongoing engagement with the land and with the beings – human and non-human – that dwell therein. I conclude that it is in confronting the need to articulate their experience in an idiom compatible with the dominant discourses of the state that people are led to lay claim to indigenous status, in terms that nevertheless systematically invert their own understandings.

Before proceeding further I should enter two qualifications. First, it may reasonably be objected that formal attempts to define the indigenous can only be understood in the political context of peoples' struggles, against the odds, to restore their security, dignity, well-being and self-esteem after years of marginalisation and oppression. The intent and meaning of any definition, in other words, must lie in the effort to reconfigure the relations between a historically disadvantaged and numerically under-represented minority and the encompassing nation state (Saugestad 1998: 31). To focus exclusively on criteria of eligibility – let alone on one particular criterion, that of descent – in isolation from the contexts of their application, surely misses the point. My response to this objection is simply to stress that what follows is not intended as a contribution to the analysis of the relations between indigenous minorities and nation states. Rather, I take one particular definition of indigenous status, formulated by the ILO, as an example of a way of thinking about what it means to be indigenous which, I believe, is symptomatic of more fundamental patterns of thought. It is these underlying patterns that I aim to explore. To observe that people face a genuine dilemma in articulating their aspirations within the hegemonic discourse of their erstwhile oppressors is not to question the worth or the integrity of their political project. They may indeed have no alternative.

The second qualification concerns the connection between the genealogical model and the troublesome notion of modern or Western thought. The examples on which I draw come predominantly from studies of hunting and gathering societies. In such societies, people are rarely concerned with tracing paths of genealogical ancestry and descent. Yet we know from ethnography that in a great many agricultural and pastoral societies, the narration of such paths is a major preoccupation. Do agriculturalists and pastoralists, then, operate with a genealogical model? Is this, to revert to an older anthropological terminology, what distinguishes 'tribal' from 'band-level' societies? By and large, I think not. As a first hypothesis, I would suggest that genealogical thinking in agricultural and pastoral societies is carried on within the context of a relational approach to the generation of knowledge and substance. That is to say, it is embedded in life-historical narratives of the deeds of predecessors, of their movements and emplacements, and of their interventions

– oftentimes from beyond the grave – in the lives of successors. The genealogical model turns this logic on its head. Here, genealogical connection becomes the context both for thinking about relationships and for their enactment, rather than vice versa. Such a model is indeed characteristic of Western modernity. But I would hesitate to attribute it exclusively to the modernist episteme. Modern thought cannot have sprung, fully fashioned, from nowhere, but must owe something to more deep-seated and enduring forms of consciousness. As a second hypothesis, I would suggest that the genealogical model is an aspect of just such a form and that it belongs, in this respect, with the generative conditions for modernity rather than with modernity *per se*. To test either of the aforementioned hypotheses, however, would call for a major investigation that lies well beyond the scope of the present chapter.

THE GENEALOGICAL MODEL

Ancestry

One of the most potent images in the intellectual history of the Western world has been that of the tree (Deleuze and Guattari 1988: 18). We use tree diagrams to represent hierarchies of control, schemes of taxonomic division, and above all, chains of genealogical connection. It is the tree as genealogy that specifically concerns me here. Early drawings of such trees in the Western tradition draw copiously on Biblical imagery, depicting the family of man as so many branches radiating from a trunk whose roots are planted firmly in the land. Here, at the base of the trunk, lies the autochthonous Adam, the first man – who, as St Paul declared in his Epistle to the Corinthians, is unequivocally 'earthy'. Despite the revolution wrought by evolutionary theory in our conceptions of time and of humankind's place in nature, this basic picture has remained little changed (Bouquet 1995: 42–3). Thus Alfred Kroeber, in his *Anthropology* of 1948, used the Biblical figure of the 'tree of the knowledge of good and evil', rooted in the Garden of Eden, to illustrate his view of the history of human culture as a tree whose branches – unlike those of its neighbour, the 'tree of life' – could grow together as well as split apart (see Figure 8.1). Contemporary palaeo-anthropologists continue to delve in the earth for human origins, and while the earliest ancestors of man are no longer thought to have been specially created but rather to have arisen by way of an evolutionary phylogeny that is itself depicted as a vast genealogical tree, they remain uniquely placed at the roots of history: in possession of the full suite of human capacities, yet still committed – like all other creatures – to a life wholly confined within the natural world.

Almost invariably, these ancestors are portrayed as hunter-gatherers. Like the earthy Adam, they are supposed

Figure 8.1 'The tree of life and the tree of the knowledge of good and evil – that is, of human culture'.

Reproduced from *Anthropology* by A. L. Kroeber, Harcourt Brace Jovanovich, 1948, p. 260.

to remain *of* the land, as opposed to cultivators who, having broken through the bounds of nature and 'branched out' over the territories of the globe, proceed to settle *upon* it. This opposition, between people *of* and *on* the land, continues to inform public awareness, in the West, of the difference between indigenous people and colonists. The former are seen to embody, in their present way of life, the ancestral condition of those who were 'there first', at the point where history began. Concern for the heritage of indigenous peoples is thus tempered by a perception that they, in turn, represent an essential part of the heritage of global humanity. Their place is understood to lie at the foot of the tree of human culture. As culture rises from the land, branching out into its many lines, so history rises up from the ground of nature. That history, however, is conceived as one of colonisation. In the popular conception, colonists – by the very fact of their occupation of the land – inevitably establish their domination over indigenes, just as culture is bound to dominate nature. Land is there to be occupied, but does not itself contribute to the constitution of its occupants. It therefore lies outside of history.

How, then, is the connection established between ancestral humans and contemporary indigenes? The answer, as we have already seen, is generally couched in the idiom of descent. Present-day indigenous people, it is supposed, are in some sense 'the same' as the people who were there at the very beginning, because the former are descended from the latter. There is, however, a striking contrast between the image of the tree, 'rising up', and that of descent as 'going down', and it is probably no accident that images of the first kind tend to dominate in progressivist accounts of the advance of human civilisation, whereas images of the latter kind appear in more relativistic accounts of the continuity and diversification of local tradition. Certainly, ever since W. H. R. Rivers introduced what he called the 'genealogical method' into anthropological inquiry, it has been conventional to upend the tree, placing its roots at the top (Bouquet 1995: 42–3; 1996). The effect of this inversion, however, is to erase the image of the tree as a living, growing entity, branching out along its many boughs and shoots, and to replace it with an abstract, dendritic geometry of points and lines, in which every point represents a person, and every line a genealogical connection. Thus a vertical line connecting two points, A and B, stands for the proposition, 'person B is descended from person A'.[3] My question, which goes to the heart of anthropological studies of kinship, is: what, exactly, is implied by this line? Or to rephrase the question in negative terms, what does it leave out?

Generation

To begin with the positive part of the answer: the implication is that the essential or substantive components of personhood are 'handed on', fully-formed, as an endowment from predecessors. Their origins, in other words, lie in the completed past, rather than in the present lives of recipients. From this it follows that the practical activities of people in the course of their lives – in relating to others, making artefacts and inhabiting the land – are not themselves generative of personhood but are rather ways of bringing already established personal identities into play. And this, in turn, answers our question in its negative formulation. For if the essential elements of personhood are given by virtue of genealogical connection, independently of the situational contexts of human activity, then a person's location on a genealogical chart – in which every line is a link in a chain of descent – says nothing about his or her actual placement *in the world*.[4] As every person in the chain is but an intermediary, passing on to successors the rudiments of being

received from predecessors, what each does in his or her life – though it may influence the possibility of transmission – has no bearing on its content. The circumstances of your existence could affect whether you have many, few or no descendants, but not what you pass on to them. A genealogy therefore presents a history of persons in the very peculiar form of a history of *relatedness*, which unfolds without regard to people's *relationships* – that is to their experience of involvement, in perception and action, with their human and non-human environments. I shall return to the distinction between relatedness and relationship, since it is critical for my argument.

What we have just discovered, cleverly concealed behind the apparently innocent graph of the line of descent, is an assumption that persons are brought into being – that is, generated – independently and in advance of their entry into the lifeworld, through the bestowal of a set of ready-made attributes from their antecedents. This assumption lies at the very core of the genealogical model, and all its remaining features can be derived from it. In particular, it implies that the generation of persons is not a life process. On the contrary, life and growth are conceived as the enactment of identities, or the realisation of potentials, that are already in place. It is descent, the passing down of the components of being underwriting one life-cycle to the site of inauguration of another, that generates persons. Thus the genealogical model, in separating out the generation of persons from their life in the world, also splits the descent-line from the life-line. In so doing it establishes the conventional notion of the *generation*, defined by the Oxford English Dictionary as 'offspring of the same parent regarded as a step in a line of descent from an ancestor'. Whereas life goes on within each generation, descent crosses from one generation to the next in a cumulative, step-by-step sequence (Figure 8.2).

With each new generation, those preceding it regress ever further into the past. Life, however, is lived in the present. Thus the present is set over against the past along the lines of generational succession and replacement. The confinement of life to the present leaves the past lifeless or extinct. Philippe Descola catches the essence of this view, so characteristic of modernity, in his observation that 'the present exists for us only thanks to the inexorable abolition of the past from which it proceeds' (1996b: 226). The idea of the past as an age that is spent, and that has no further part to play in what is to come, is one of the hallmarks of genealogical thinking. But in separating the descent-line from the life-line, the genealogical model also divorces time from being. The events that follow one another along a line of descent, like beads on a string, do not take place in the lives of persons, they *are* persons. The existence of each is collapsed into the moment of the event it represents. And these events, in turn, are suspended in a time that is abstract and chronological (Ingold 1986b: 128–9). The same logic that maps being upon the plane of the present also stretches time to eternity, yielding the classic dichotomy between synchrony and diachrony.
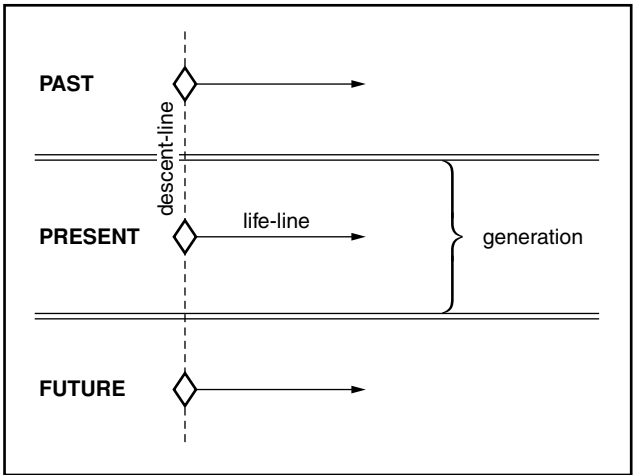
Figure 8.2 The relation between descent-line, life-line and generation, according to the genealogical model.

Arrayed diachronically in linear sequence, reaching back to 'time immemorial', persons of the past are removed from their present descendants by a distance measured out in generations.

Substance

Now it is commonly supposed that the total endowment a person-to-be receives, by way of descent, can be divided into two components, respectively material and ideational. The first comprises the ingredients of bodily substance; the second the contents of cultural memory. It was once customary to speak of the former in terms of kinds – or colours – of 'blood', a usage preserved in the technical concept of consanguineal kinship (connection based on 'shared blood') as well as in a multitude of expressions of everyday currency in the Western world (Schneider 1968: 23–5, Bouquet 1993: 17–21). Nowadays, one is as likely to hear it said of some feature of a person that it is 'in the genes' as to be told that it is 'in the blood'. But the sense of such pronouncements has hardly been altered by the substitution of genetic for sanguinary metaphors. If anything, the science of genetics has not so much challenged as taken on board – and in turn lent authority to – the founding principles of the genealogical model, namely that persons embody certain attributes of appearance, temperament and mentality by virtue of their ancestry, and that these are passed on in a form that is unaffected by the circumstances or achievements of their life in the world. These principles underly the belief, for example, in a species-wide human nature which has come down to us more or less unchanged from its evolutionary origins in the Pleistocene era, while remaining immune to the upheavals of history (see Chapter Twenty-one).

Where, however, the very same principles are adduced to justify a narrower claim to ethnic distinctiveness, based on the assertion of common descent from an 'original' ancestral population, the claim is bound to take on implicitly – if not explicitly – racial overtones. This should come as no surprise, since the concepts of race and of generation, in the specific sense of procreation implied by the genealogical model, are etymologically linked, both derived from the Latin *generare*, 'to beget' (Wolf 1994: 1). All attempts to ascribe indigenous identity on the criterion of descent have been plagued by the problem of miscegenation, and by concern over the degrees of racial impurity to which this is perceived to give rise. What proportion of colonists can one number among one's ancestors while yet qualifying as an indigenous person? If indigenous people are marked out by their common possession of an ancestral essence, how can some persons claim to be more indigenous than others? In practice, efforts to accommodate the real complexities of genealogical connection within essentialist categorisations based on the sharing of substance through descent have invariably led to the endless ramification of ever finer lines of discrimination and exclusion whose imposition – which may have real consequences for those affected in terms of access to resources and arenas of decision-making – appears increasingly arbitrary.

Memory

Turning from the transmitted component of bodily substance to the ideational component of cultural memory, we find the assumptions of the genealogical model replicated, once again, in an approach to culture as a corpus of traditional wisdom, handed down as a legacy from the past, and which is applied or expressed, rather than actually

generated, in the contexts of present activity. This approach has venerable anthropological antecedents, and continues to inform much contemporary discussion. Culture, it is commonly said, consists of 'what one needs to know in order to behave as a functioning member of one's society'.[5] Notice how, in this view, the acquisition of cultural knowledge is clearly distinguished from the practicalities of its use that come under the rubric of 'functioning'. What divides acquisition from functioning is none other than the division, inherent in the genealogical model, between the generation of persons and their life in the world. As the descent-line is split off from the life-line, so the intergenerational transmission of knowledge is distinguished from environmentally situated experience. And in psychology as in biology, mainstream science has incorporated the principles of the model into its own conceptual frame. Thus a distinction is posited between 'social learning', by which information is copied into the head of the novice, and 'individual learning', born of the experience of putting it into practice (I return to this distinction in Chapter Twenty-one, pp. 386–7). The former takes place *across* generations; the latter is confined *within* each generation. A glance at Figure 8.2 reveals the congruence between these concepts and the terms of the genealogical model.

What does all this imply about memory? If culture is taken to consist of a body of acquired information that is available for transmission independently of the contexts of its application in the world, then memory must be something like an inner cabinet of the mind, in which this information is stored and preserved from the vagaries of everyday life. Whatever people do, or wherever they go, they carry the contents of memory with them. It is an encyclopaedic resource on which they can continually draw for guidance on how to proceed in a manner appropriate to the circumstances in which they find themselves. Remembering, then is a matter of retrieving from storage – or 'calling up' – items of information relevant to the situation at hand. Critically, this implies that objects of memory pre-exist, and are imported into, the contexts of remembering. They are already present, in some representational form, within the native mind. Thus, far from bringing memories *into* being, remembering serves to bring *out*, or to disclose, knowledge that has been there from the start. In short, from the perspective of the genealogical model, remembering is no more generative of the contents of memory than is life activity generative of the person. And this, in turn, means that if people share memories, it is not because of their mutual involvement in joint activity within a certain environment, but because their knowledge has come down to them from the same ancestral source, along the lines of common descent. They are bound by an identity not only of bodily substance but also of cultural tradition – by both inheritance and heritage.

Land

If the sharing of substance and memory by dint of common descent is what makes people the same, then what makes them different? Here I want to argue that one of the key entailments of the genealogical model is that *difference is rendered as diversity*. That is to say, the model leads us to compare individuals in terms of such qualities as they may possess, by virtue of their essential natures, irrespective of their positioning *vis-à-vis* one another in the world. Diversity is the measure of difference as construed within a comparative project of this kind, one that presumes a world already divided into discrete, unit entities – 'things-in-themselves' – which may then be grouped into classes of progressively higher order on the basis of perceived likeness. This classificatory exercise gives rise to the familiar tree-diagrams of taxonomy, with their roots in the highest, most inclusive levels

and branches reaching out into lower levels of ever finer discrimination. Where it is further supposed that every individual derives the specifications of its essential nature by *descent*, then the taxonomic tree readily translates into a genealogical one.

To be sure, the translation is not perfect – a fact that has ignited fierce and still un-resolved controversies among scholars engaged in the reconstruction of both evolutionary phylogenies and cultural (especially philological) histories. These controversies need not detain us here:[6] they have to do with the method of reconstruction but do not touch the more fundamental assumption that difference arises from the accumulation of minor vari-ations along lines of descent in the content of transmitted information, whether biogenetic or cultural, due to errors in the process of intergenerational transcription. In genetics these errors are known as mutations; analogous forms of miscopying have often been suggested for the histories of language and culture. Assuming, then, that difference increases with genealogical distance, we might reasonably conclude that one indigenous person is more like another from the same ethnic group than a colonist whose ancestors came from else-where, but more like the latter – who is, after all, a fellow human being – than, say, a chimpanzee. But these similarities and differences have absolutely nothing to do with the life-histories of the individuals whom we are comparing: where they have lived, what they have done, or whether they share any experiences in common. Their source, in other words, lies not in current fields of relationship but in past histories of relatedness.

Now as we have already seen, a person's position within such a history – that is, their *genealogical* position – is fixed quite independently of their position and involvement in the lifeworld. It follows that the difference between the indigenous person and the colonist, insofar as it is attributable to descent, does not reflect their respective modalities of habi-tation of the land. Indeed the land, conceived in its broadest sense as a field of dwelling for beings of all kinds, human and non-human, simply has no place at all within a genealogically inspired conception of biocultural diversity. If each and every individual is constituted by the sum total of bodily substance and cultural knowledge received down the line from ancestors, then the land itself can be no more than a kind of stage upon which is enacted a historical pageant consisting of the succession of generations. At no point does it enter directly into the constitution of persons – with one exception, namely at the mythical point of autochthonous origin. And this takes us back to the question of ancestry.

The genealogical model, it seems, presents us with a stark choice. Either we grant indige-nous peoples their historicity, in which case their existence is disconnected from the land, or we allow that their lives are embedded in the land, in which case their historicity is collapsed into an imaginary point of origin. In the first option, an original connection to the land is converted into an object of memory that is handed down as a heritable attribute of individuals without further regard to its source. In the second, it is as though indige-nous people lived in suspended animation in a prehistoric world of unadulterated nature which the rest of humanity has long since left behind. Land and history, in short, figure as mutually exclusive alternatives. For indigenous people themselves, by contrast, it is in their relationships with the land, in the very business of dwelling, that their history unfolds. Both the land and the living beings who inhabit it are caught up in the same, ongoing historical process. To comprehend this process, we need a different, relational model, and it is to this that I now turn.

THE RELATIONAL MODEL

Ancestry

'We're tired of trees', sigh Gilles Deleuze and Félix Guattari in a moment of exaspera-tion. 'They've made us suffer too much' (1988: 15). In place of the arborescent, dendritic imagery of the genealogical model they offer an alternative figure, that of the *rhizome*. This is to be envisaged as a dense and tangled cluster of interlaced threads or filaments, any point in which can be connected to any other. Whether the image is botanically accu-rate need not concern us here.[7] It has the virtue of giving us a way of beginning to think about persons, relationships and land that gets away from the static, decontextualising linearity of the genealogical model, and allows us to conceive of a world in movement, wherein every part or region enfolds, in its growth, its relations with all the others. 'The rhizome', as Deleuze and Guattari repeatedly insist, 'is an antigenealogy' (1988: 11, 21). To put it more positively, it is a progeneration, a continually ravelling and unravelling relational manifold. I believe that a relational model, with the rhizome rather than the tree as its core image, better conveys the sense that so-called indigenous people have of themselves and of their place in the world. In what follows, I review the five terms of my earlier discussion – ancestry, generation, substance, memory, land – in the light of this alternative model. To begin with the first, our question is: what is the meaning of ancestry in a rhizomatic world where the rudiments of being are not transmitted along arboreal lines of genealogical connection?

Part of the difficulty we have in addressing this question lies in the sheer multiplicity of possible answers. Here I suggest just four. Ancestors can be ordinary humans who lived in the past, or spirit inhabitants of the landscape, or mythic other-than-human charac-ters, or original creator beings. As an illustration of the first possibility, consider the following passage in which Signe Howell describes the myriad signs that the Chewong of Malaysia discern as they move around in their jungle environment. 'These may be paths made by animals, a fruit tree planted by an ancestor, stones which are inhabited by poten-tially harmful beings, fallen tree-trunks, the place where an event in a particular myth took place, etc.' (1996: 132). The ancestor mentioned in this passage was an ordinary human predecessor whose activity, in this case of planting a tree, left an enduring token in the landscape. But his contribution to successors was not to hand anything down by way of substance or memory (thereby converting 'successors' into 'descendants'); it was rather to play a small part, along with the innumerable other beings – human, animal, spiritual – that have inhabited the forest at one time or another, in creating the environ-ment in which people now live, and from which they draw their sense of being. Passing by the fruit tree, contemporary Chewong may be reminded of the ancestor's erstwhile presence and deeds, but it is in such acts of remembrance, not in any transmitted endow-ment carried in their bodies and minds, that he lives on.

The second possibility may be illustrated by means of an example from Nurit Bird-David's account of the Nayaka of Tamil Nadu, South India. 'Nayaka refer', she reports, 'to the spirits that inhabit hills, rivers, and rocks in the forest and to the spirits of their immediate forefathers alike as *dod appa* ("big father") and *dod awa* ("big mother")' (1990: 190, see also Chapter Three, pp. 43–4). For anthropological analysts primed with the genealogical model of kinship, such usages have caused no end of trouble. Surely, it is argued, people cannot really be descended from beings embodied in features of the land-scape, as they are from their own forefathers. Classically, anomalies of this kind have been

dealt with by constructing a special category of 'fictive kinship' which is modelled on, but nevertheless fundamentally distinct from, the 'real' kinship founded in genealogical connection. But the people themselves, for whom there is no anomaly, are telling us something quite different. It is that the role of parents is not, as the genealogical model implies, to pass on to their offspring the essential specifications of personhood in advance of their entry into the lifeworld, but rather – by their presence, their activities and the nurturance they provide – to establish the necessary conditions in the environment for their children's growth and development. This is what kinship is all about. And since the spirit inhabitants of the land contribute to human well-being equally, and on the same footing, as do human forbears, providing both food, guidance and security, they too can be 'big' fathers and mothers. As such, they are ancestors of a sort, albeit ones that are alive and active in the present.[8]

For an illustration of the third possibility, we can return to A. Irving Hallowell's ethnography of the Ojibwa of Berens River, Manitoba, which I have already considered at length in Chapter Six. The characters of Ojibwa myths are known collectively by a term, *ätíso'kanak*, that translates as 'our grandfathers'. They include the Sun, the Four Winds, and the 'masters' of various animal species. Despite their mythic status, these 'other-than-human' characters are entirely real in Ojibwa experience. They are regarded, according to Hallowell, 'as living entities who have existed from time immemorial. While there is genesis through birth and temporary or permanent form-shifting through transformation, there is no outright creation' (1960: 27). In other words, the other-than-human grandfathers have been there all along, living a parallel existence to ordinary humans with whom they may enter into close and, for the latter, lifelong relationships. Just like human grandfathers, they are a source of protection, and especially of wisdom. But this wisdom, gained above all through dream experience, takes the form not of knowledge that is 'passed down' but of a heightened perceptual awareness that reveals the world of one's waking life in a new or enriched light. Crucially, Ojibwa make no more claim to be descended from their grandfathers than do Nayaka to be descended from the spirits of the landscape. Grandfathers are ancestors because they were there before you, and because they guide you through the world. In that sense you follow them. But you are not descended from them.

The fourth and final possibility is most fully elaborated in the ethnography of Aboriginal Australia. The ancestors celebrated in Aboriginal myth and ceremony were creator beings who, in their world-forming activities, roamed across the face of the earth, emerging onto the surface here, going 'back in' there, and travelling from place to place – though in no particular direction – in between. The landscape itself is a reticulate maze of criss-crossing lines of ancestral travel, with the most significant localities at its nodal points. Localities identified by particular landscape features – hills, rocks, gullies, waterholes and so on – embody the ancestors' powers of creativity and movement in a congealed form. It is these powers, in turn, that engender living persons. Through conception, birth or long-term residence a person incorporates the essence of a locality into his or her own being, even to the extent of substantial identity. A nice illustration of the point comes from Nancy Munn's (1970) study of the Pitjantjatjara of the Australian Western Desert. On the subject of birthmarks – which are called *djuguridja*, 'of or pertaining to the ancestors' – Munn recalls one woman explaining that a mark on her body was also to be found on a particular ancestral rock at her birthplace. 'The rock was the transformed body of the ancestor lying down and the marking was originally his hair' (Munn 1970: 146). In this case there is indeed a bond of substance between the ancestor and the living person, but it is not

one of descent. Following Munn, it might better be described as a kind of reverse meta-morphosis, in which the subject-turned-object (the ancestor transformed into the rock in the Dreaming) becomes an object-turned-subject (the rock imprinting upon the body of the living person at birth).

Now if there is one thing that our four examples have in common, it is that in no case can the connections between ancestors and living people be described in terms of a dendritic geometry of points and lines. Indeed there are no points as such. Every being is instantiated in the world as the line of its own movement and activity: not a movement from point to point, as though the life-course were already laid out as the route between them, but a continual 'moving around', or coming and going. Significant moments – births, deaths, encounters with animals or spirits, coming out of the ground or going back in – are constituted *within* this movement, where the life-lines of different beings cross, interpenetrate, appear or disappear (only, perhaps, to reappear at some other moment). Try to depict the relations between beings, ancestral and living, in the form of a tree, and its boughs would intertwine, grow together as well as split apart, in a profusion of cross-cutting connections. Indeed our tree, comprehensively entangled in such transverse ties, would cease to look like a tree at all, and take on all the appearance of a rhizome! As Deleuze and Guattari observe, 'transversal communications between different lines scramble the genealogical trees' (1988: 11).[9] Our next task is to examine the implications of this rhizomatic view for the concept of generation.

Generation

We have seen that the genealogical model collapses the life of each person into a single point, which is connected to other such points by lines of descent. A relational model presents us with precisely the opposite picture. There are no lines of descent linking successive 'generations' of persons. Rather, persons are continually coming into being – that is, undergoing generation – in the course of life itself. To put it in a nutshell: whereas in the genealogical model life is encompassed within generations, in the relational model generation is encompassed within the process of life. But this also entails a radically different conception of the person. According to the genealogical model, every person is a substantive entity, whose particular make-up is a function of biogenetic and cultural specifications received from predecessors, prior to its involvement with other entities of like or unlike kinds. By contrast, the relational model situates the person in the lifeworld from the very start, as a locus of self-organising activity: not a generated entity but a site where generation is going on.[10] Perhaps no-one has expressed the point better than a Cree man from the James Bay region, who, as will be recalled from Chapter Three (p. 51), explained to the ethnographer, Colin Scott, that to be a person is to live, and that life (*pimaatisiiwin*) is a process of 'continuous birth' (Scott 1996: 73).

This, too, is what I had in mind in positively redescribing the antigenealogical, rhizomatic character of the lifeworld as *progenerative*. Entailed here is a distinction between pro-generation and procreation. The latter term captures the sense of begetting implied when we say that one being is descended from another. It suggests a one-off event: the making of something absolutely new out of elements derived from immediate antecedents. By progeneration, in contrast, I refer to the continual unfolding of an entire field of relationships within which different beings emerge with their particular forms, capacities and dispositions. Consider, for example, the relations between human hunters and their animal prey. Thinking genealogically, one would suppose that as humans beget humans, so moose

(say) beget moose – so long as hunters leave sufficient animals alive to ensure their procreative replacement. Not so, however, for the Rock Cree of northern Manitoba, whose understanding of human–animal relations has been richly documented by Robert Brightman (1993). Cree say that moose present themselves willingly to be killed by hunters, and in that way contribute actively to the production of human existence. But conversely, hunters, in their treatment of kills in consumption and disposal of the remains, bring it about that the vitality of animals is restored, and so contribute to the production of animal existence. As Brightman explains, 'hunter and prey successively renew each other's lives, and, indeed, each seems to realize its innate nature in the transaction, the hunter as supplicant and the animal as benefactor' (1993: 188).

Here, hunting – including acts of killing, consumption and disposal – is the very epitome of progeneration. In the unfolding of the relation between hunters and prey both humans and animals undergo a kind of perpetual rebirth, each enfolding into its inner constitution the principle of its relationship to the other. Actual events of birth and death, therefore, are merely moments in the progenerative process, points of transition in the circulation of life. Once again, this conclusion stands in stark contrast to the images of life and death evoked by the genealogical model. For according to this model, as we have seen, life does not cross generations, but is expended in the present, in the procreative project of forwarding the elements needed to get it restarted in the future.[11] In each successive generation, the life-cycle begins at the point of conception and ends at death. When a person dies his or her life is over, finished. With a relational model, by contrast, life does not start or stop. To borrow a phrase from Deleuze and Guattari, it is a matter of 'coming and going rather than starting and finishing' (1988: 25). Particular persons may come and go, but the life process continues. All of existence is suspended in this process. Animals come when, following the successful hunt, they enter the human community, they go again with the eventual disposal of the remains. But the animal that has gone has not ceased to be: it still exists, albeit in another form. And for this reason, there is always the possibility of its return. As one Cree hunter told Brightman, 'they say it just comes up again and again' (1988: 240).

What goes for animals also goes for human beings. It should come as no surprise, therefore, that the relational model tends to be associated with ideas of reincarnation and cyclical rebirth. When an old person dies, it does not mark the end of a generation, which will henceforth recede ever further into the past as it is buried under layer after layer of new people. The fact that deceased persons are no longer present does not mean that they belong to a past that has been irrevocably left behind, but rather that they have departed from the living, along a path that takes them to what is often conceived as another land. Co-presence may be temporally bounded, but existence is not. Or to put it in another way, the past may be absent from the present but is not extinguished by it. Death punctuates, but does not terminate, life. Writing of the Yup'ik Eskimos of Alaska, Ann Fienup-Riordan notes that 'death as a final exit had no place in [their] system of cosmological reproduction . . . Birth into the land of the dead was ultimately the source of continuing life' (1994: 250). Thus, far from calling for the replacement of one generation by another, death affirms the continuity of the progenerative process. Life is not compacted, as the genealogical model implies, into a linear sequence of procreative moments suspended in time, but is itself intrinsically temporal. As the philosopher Henri Bergson wrote, 'wherever anything lives, there is, open somewhere, a register in which time is being inscribed' (1911: 17). And the life of every being, as it unfolds, contributes at once to the progeneration of the future and to the regeneration of the past.

Substance

I have suggested that from a relational perspective, persons should be understood not as procreated entities, connected to one another along lines of genealogical connection or *relatedness*, but rather as centres of progenerative activity variously positioned within an all-encompassing field of *relationships*. Every such centre, as Rom Harré puts it, is 'a site from which a person perceives the world and a place from which to act' (1998: 3). It is from their emplacement in the world that people draw not just their perceptual orientations but the very substance of their being. Conversely, through their actions, they contribute to the substantive make-up of others. Such contributions are given and received throughout life, in the context of a person's ongoing relationships with human and non-human components of the environment. Thus, far from having their constitution specified in advance, as the genealogical model implies, persons undergo histories of continuous change and development. In a word, they *grow*. Indeed more than that, they are *grown*. By this I mean that growth is to be understood not merely as the autonomous realisation of pre-specified developmental potentials, but as the generation of being within what could be called a sphere of nurture.[12] It is the role of ancestors, as our earlier examples demonstrated, to establish this sphere by way of their presence and their activity, rather than to pass on the rudiments of being *per se*. That is to say, ancestors grow their successors, although the latter are not literally descended from them. But this nurturing role is not limited to ancestors: ordinary living persons, too, contribute reciprocally to the conditions of each other's growth as embodied beings. It is in these contributions, as we have seen, that their kinship consists.

Now while each person is at the centre of their own field of perception and action, the position of this centre is not fixed but moves relative to others. As it does so, it lays a trail. Every trail, however erratic and circuitous, is a kind of life-line, a trajectory of growth. This image of life as a trail or path is ubiquitous among peoples whose existential orientations are founded in the practices of hunting and gathering, and in the modes of environmental perception these entail. Persons are identified and characterised not by the substantive attributes they carry into the life process, but by the kinds of paths they leave. Beings of extraordinary power, such as the world-shaping ancestors of Australian Aboriginal cosmology or the other-than-human persons of the Ojibwa, can be recognised from their unusual paths which can, for example, leave indelible impressions on the landscape or even disappear underground. In the world of the Yup'ik Eskimos, one class of extraordinary persons, the *tenguirayulit*, are so fleet of foot that they can literally take off, leaving a trail of wind-blown snow in the trees (Fienup-Riordan 1994: 80). While the paths of ordinary human beings and other terrestrial animals remain on ground level, even plants deposit trails in the form of roots and runners in the wake of their advancing tips. Batek women from Pahang, Malaysia, say that the roots of wild tubers 'walk', as humans and other animals do (Lye 1997: 159). This may seem an odd idea to us, but only because we think of walking as the spatiotemporal displacement of already completed beings from one point to another, rather than as the movement of their substantive formation within an environment. Both plants and people, we could say, 'issue forth' along lines of growth, and both exist as the sum of their trails (see Wagner 1986: 21).

Putting together all the trails of all the different beings that have inhabited a country – human, animal and plant, ordinary and extraordinary – the result would be a dense mass of intersecting pathways, resembling nothing so much as a rhizome. This is not to rule out the possibility that particular growth configurations may be dendritic in form.

After all, among hunters and gatherers who inhabit a forest environment, some of the most important persons can be trees! This is beautifully demonstrated in Tuck Po Lye's recent study of the Batek, to which I referred a moment ago. For the Batek, trees are people. They possess agency and sociality. They can be both nurturing and protective, and dangerous (Lye 1997: 156–63). But of course there is a world of difference between the real, living tree in the forest and the abstract tree of the genealogical model. For the former is caught up in a dense network of entanglements with the vegetation that clings to it, the animals that forage and nest in it, and the humans that live under it. In short, the tree is but one part of that vast rhizome that is the forest as a whole. Only when it is abstracted from these rhizomatic entanglements does it appear in its 'pure', dendritic form.

I have already shown that a person's genealogical position is fixed independently of their location in the lifeworld. By contrast, every position in the total network of trails or life-lines is itself an emplacement. Lye draws explicitly on the 'rhizomatic epistemology' of Deleuze and Guattari to explain how, for the Batek, places are constituted as nodes in the endless comings and goings of people, each characterised by its particular assemblage of relations, and connected to all the others both socially and physically. 'Important place-names, trails and familiar campsites, like the roots of a rhizome, integrate diverse elements of the forest and serve as passageways for the ongoing experiences of people' (1997: 166). Among hunters and gatherers generally, the most significant places are where the paths of different beings intersect, or perhaps merge for a while before diverging again. It is here that exchanges of substance occur, for example in episodes of hunting, where the trails of human and animal cross and from which each leaves bearing something of the substance of the other, or of gathering, where people pick and consume the fruit of a tree once planted by an ancestor. Among themselves human persons exchange substance through feeding and being fed, in the nurturance and sharing that characterises the everyday life of a camp – which may be envisaged, in turn, as a place upon which the trails of many people temporarily converge.

Once again, this relational understanding inverts the genealogical model. Instead of thinking of substance as passing along a line of transmission connecting lives that – confined within their respective generations – proceed in parallel but never join, persons are conceived as passing along lines of movement and exchanging substance at the places where their respective paths cross or commingle. 'Throughout their lives', as Bird-David puts it, persons 'perpetually coalesce with, and depart from, each other' (1994: 597).[13] I have attempted to depict the contrast schematically in Figure 8.3; however in limiting the picture to a mutually constitutive encounter between two persons, A and B, it has been drastically oversimplified. In reality, as Fienup-Riordan says for the Yup'ik, 'the variety of persons and creatures that one might encounter in one's path is immense' (1994: 87). All of these beings may further one's growth and development, not only through contributions of substance, but also by way of the experiences they afford.

Thus the contrast shown in Figure 8.3 applies just as well to the growth of knowledge as to that of bodily substance. Knowledge, from a relational point of view, is not merely applied but generated in the course of lived experience, through a series of encounters in which the contribution of other persons is to orient one's attention – whether by means of revelation, demonstration or ostention – along the same lines as their own, so that one can begin to apprehend the world for oneself in the ways, and from the positions, that they do. In every such encounter, each party enters into the experience of the other and makes that experience his or her own as well. One shares in the process of knowing, rather
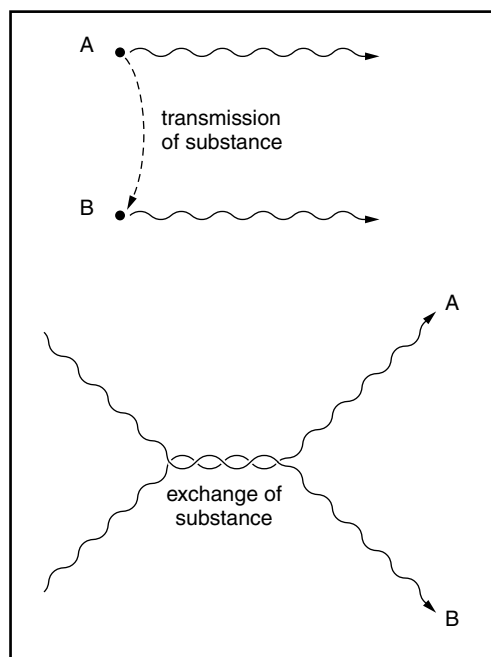
Figure 8.3 Schematic contrast between the transmission of substance according to the genealogical model, and the exchange of substance according to the relational model. For simplicity, the diagram depicts only two persons, A and B.

than taking on board a pre-established body of knowledge. Indeed in this education of attention, nothing, strictly speaking, is 'handed down' at all. The growth and development of the person, in short, is to be understood relationally as a *movement along a way of life*, conceived not as the enactment of a corpus of rules and principles (or a 'culture') received from predecessors, but as the negotiation of a path through the world (see Chapter Thirteen).

Memory

With this, we are led to pose a question about memory not unlike the one posed earlier, about ancestry. There we asked: what is the meaning of ancestry in a lifeworld where the elements of a person's substantive make-up are not passed on along lines of descent? The question that concerns us now is: what is the meaning of memory in a world of experience where the rudiments of knowledge are not handed down along analogous lines of cultural transmission? A large part of the answer hinges on our understanding of language. For according to the genealogical model, it is above all thanks to language that the concepts and values of a culture are transmitted from one generation to the next. Not only does this presuppose that cultural knowledge exists in the form of a corpus of transmissible, context-free representations; it also implies that the words of language take their meanings from their attachments to these representations, quite apart from the situations of their utterance in speech. The purpose of speaking, then, is to render explicit, or publicly accessible, meanings that would otherwise remain confined within the interiority of the mind – nevertheless only to those who share the language and are therefore in a position to decode the messages conveyed therein.[14] It follows that the loss of a language inevitably leads to the loss of the knowledge expressed in it, which will die out with the last generation of speakers. Much concern over the disappearance of indigenous languages is fuelled by a fear that with them will go traditions that have been handed down from time immemorial, severing once and for all the increasingly tenuous threads that connect present humanity to its ancestral past.

If, however, as the relational model implies, the source of cultural knowledge lies not in the heads of predecessors but in the world that they point out to you – if, that is, one learns by discovery while following in the *path* of an ancestor – then words, too, must gather their meanings from the contexts in which they are uttered. Moving together along a trail or encamped at a particular place, companions draw each other's attention, through speech and gesture, to salient features of their shared environment. Every word, spoken in context, condenses a history of past usage into a focus that illuminates some aspect of the world. Words, in this sense, are instruments of perception much as tools are instruments of action. Both conduct a skilled and sensuous engagement with the environment that is sharpened and enriched through previous experience. The clumsiness of the novice

in handling unfamiliar tools is matched, as every anthropological fieldworker knows, only by his incomprehension of spoken words. What the novice lacks, however, and the knowledgeable hand possesses, is not a scheme of conceptual representations for organising the data of experience but rather the perceptual sensitivity that enables him to discern, and continually to respond to, those subtle variations in the environment whose detection is essential to the accomplishment of ongoing activity. From this point of view, and contrary to the tenets of the genealogical model, speech is not so much the articulation of representations as the embodiment of *feeling*. It is a way, as Maurice Merleau-Ponty once put it, 'for the human body to sing the world's praises and in the last resort to live it' (1962: 187). I return to this point in Chapter Twenty-three (pp. 408–10).

But to live the world is also to inhabit it. Thus a way of speaking is, in itself, a way of living in the land. Far from serving as a common currency for the exchange of otherwise private mental representations, language celebrates an embodied knowledge of the world that is already shared thanks to people's mutual involvement in the tasks of habitation. It is not, then, language *per se* that ensures the continuity of tradition. Rather, it is the tradition of living in the land that ensures the continuity of language. Conversely, to remove a community of speakers from the land is to cut the language adrift from its generative source of meaning, leaving it as the vestige of a form of life that has long since been overtaken by its representation as an *object* of memory. In this regard, the assumptions of the genealogical model have had fateful consequences for the peoples it construes as indigenous. For so long as it is supposed that the language, and the traditions encoded therein, can be passed along like a relay baton from generation to generation, it appears to make no difference *where* the people are. On these grounds, administrations have often seen no principled objection to moving their 'indigenous' peoples off the land, or greatly restricting their access, whether in the interests of industrial development or wildlife conservation. It did not occur to them that such displacement might rupture the continuity of tradition or cut the people off from their pasts.

I have already shown that traditional knowledge, in the genealogical conception, comprises an inventory of transmitted items that are stored in memory, from which they may be accessed as required, and expressed in speech or practice. From a relational perspective, by contrast, knowledge subsists in practical activities themselves, including activities of speaking. And just as to follow a path is to remember the way, so to engage in any practice is, at the same time, to remember how it is done. Thus hunters and gatherers, following in the paths of their ancestors as they make their way through the terrain, remember as they go along. The important thing, so far as they are concerned, is that the process should keep on going, not that it should yield precise replicas of past performance. Indeed 'keeping it going' may involve a good measure of creative improvisation. A skill well remembered is one that is flexibly responsive to ever-variable environmental conditions. Thus there is no opposition, in the terms of the relational model, between continuity and change. Change is simply what we observe if we sample a continuous process at a number of fixed points, separated in time. The growth of an organism, for example, is continuous, but if we compare its appearance at different times it will appear to have changed. So too, the growth of knowledge, conceived relationally, is an aspect of the growth of persons, in the contexts of their involvement with one another and with the environment. Just because people are doing things differently now, compared with the way they did them at some time in the past, does not mean that there has been a rupture of tradition or a failure of memory. What would really break the continuity, however, would be if people were forcibly constrained to replicate a pattern fixed by

genealogical descent, or to 'traditionalize the traditional', as Bjørn Bjerkli has nicely put it (1996: 18). The effect would be similar to that of a needle becoming stuck in the groove of a record. One could not keep the music going.

We are now in a better position to answer the question I posed at the start of this section. For if knowledge is not received from predecessors in advance of its application in the world, then objects of memory cannot pre-exist acts of remembering. Nor can such acts be understood as purely cognitive operations, of calling up representations already installed within the mind. On the contrary, it is through the activity of remembering that memories are *forged*. This activity, moreover, is tantamount to the movement of the person through the world. Memories, then, are generated along the paths of movement that each person lays down in the course of his or her life. Earlier, I pointed out that in the terms of the relational model, the progeneration of the future is also a regeneration of the past. Another way of putting this would be to say that the growth of knowledge is, at one and the same time, the production of memory. Journeying forward along a path or trail, one is also taken back to places imbued with the presence of ancestors. 'Trails', as Lye observes in her study of the Batek, 'are routes to remembrance just as they are routes to knowledge'. She recalls one Batek man pointing out a particular trail to her. 'That', he is reported to have said, 'is a trail of the old people. So when people feel *haʔip* [longing] for the old people, they come back here and use the trail so that they can remember the old people' (Lye 1997: 149).

One more example, from the other side of the world, may be drawn from Richard Nelson's study of the Koyukon of Alaska (Nelson 1983: 243). He describes how he was taken by an old woman to see a place in the forest where, long ago, the late Chief Henry and his wife Bessie had their fishing camp. Looking closely, one could make out dark bands on the birch trees, where the bark had been removed from which Bessie used to make baskets, and axe marks on the rotting stumps of trees that Chief Henry had felled. Examining these signs, which an untrained eye would have passed over completely, Nelson's companion began to talk a little sadly about the deceased couple and their activities. She spoke of the skill and sensitivity that enabled Chief Henry to select wood with the best grain for making sleds or snowshoes, or Bessie to weave excellent baskets from birchbark. Yet this same sensitivity, grounded in an intimate familiarity with the country and its inhabitants, also enabled the old woman, in her turn, to recognise the signs of the couple's erstwhile presence in an otherwise featureless and overgrown patch of forest. Memories may be forged with words, and artefacts with tools; both, however, are the fruits of a certain way of living in the land. For the old woman this way of life was not just an *object* of memory, represented and passed down in oral tradition, but also a *practice of remembering*, embedded in the perception of the environment.

Land

What, then, given this relational view of growth and remembrance, makes people more or less the same or different? Not their genealogical proximity as determined by a past history of relatedness, but the extent to which their own life-histories are intertwined through the shared experience of inhabiting particular places and following particular paths in an environment. Common involvement in spheres of nurture, rather than any principle of shared descent, creates likeness. Persons, as we have seen, are to be understood from this perspective not as preconstituted – or procreated – entities, but rather as loci of growth, of the progenerative unfolding of the entire field of relationships within which

each comes into being. The source of their differentiation is to be found in this unfolding. There is no room, within such a view, for the kind of classificatory project that groups individuals on the basis of whatever intrinsic characteristics they might happen to possess, by virtue of their biogenetic inheritance or cultural heritage, irrespective of their life in the world. Thus ethnic and racial classifications are as foreign to relational thinking as are the genealogically conceived taxonomies devised by biologists for the classification of living things. It is not by their inner attributes that persons or organisms are identified, but by their positions *vis-à-vis* one another in the relational field (Ingold 1993a: 229). The relational model, in short, *renders difference not as diversity but as positionality.*[15]

The idea of a field of relationships may seem highly abstract, far removed from the reality of entities and events 'on the ground'. Yet it is the very dominance of the genealogical model in our thinking, I would argue, that leads us to suppose that things exist, in the real world, independently of their relations. The relational model overturns this understanding. To exist, it asserts, is already to be positioned in a certain environment and committed to the relationships this entails. Reality, then, is relational through and through. The relational field is no abstraction but the very ground from which things grow, and take on the forms they do. Another word for this ground is *land*. Up to now I have spoken of beings of various kinds as 'inhabiting' the land. This should not be taken to imply mere occupancy, as though inhabitants, already endowed by descent with the attributes of substance and memory that make them what they are, were slotted into place like pegs on a peg-board. Positions in the land are no more laid out in advance for persons to occupy, than are persons specified prior to taking them up. Rather, to inhabit the land is to draw it to a particular focus, and in so doing to *constitute* a place. As a locus of personal growth and development, however, every such place forms the centre of a sphere of nurture. Thus the generation of persons within spheres of nurture, and of places in the land, are not separate processes but one and the same. In the relational model, as Leach has put it, 'kinship is geography' (Leach 1997: 36).

All this has implications for our ideas about permanence and replacement. Recall that according to the genealogical model, life is encompassed within generations. Every organism comes with its allotted lifespan, and has eventually to make way for copies of itself if its kind is to continue. Life, in short, is conceived as but a means to the end of procreative replacement. The land, by contrast, since it is supposed to contain or support living things, cannot itself be alive. For if every form of life exists *upon* the land, then the land must be inanimate. It does not, therefore, have to be replaced; it is simply, and permanently *there*, an enduring surface over which generation after generation of individuals pass like cohorts on the march. The relational model, on the other hand, does not counterpose the land to its inhabitants along the axis of a dichotomy between the animate and the inanimate. A founding premise of the model is that life, rather than being an internal property of persons and things, is immanent in the relations between them. It follows that the land, comprised by these relations, is itself imbued with the vitality that animates its inhabitants. The important thing is to ensure that this vitality never 'dries up'. As hunters and gatherers have explained to their ethnographers, with remarkable consistency, it is essential to 'look after' or care for the land, to maintain in good order the relationships it embodies; only then can the land, reciprocally, continue to grow and nurture those who dwell therein.

This perspective gives us a view of the land quite unlike the inert and timeless, two-dimensional substrate of the genealogical model. It figures rather as an immense tangle of interlaced trails – an all-encompassing rhizome – which is continually ravelling here, and

unravelling there, as the beings of which it is composed grow, or 'issue forth', along the lines of their relationships. I have referred to this ravelling and unravelling as a process of progeneration. Every being, in the course of its life history, works in the first place to keep the progenerative process going rather than to secure its own procreative replacement. Thus there is no opposition, here, between history and land. Both carry the same intrinsic temporality. Woven like a tapestry from the lives of its inhabitants, the land is not so much a stage for the enactment of history, or a surface on which it is inscribed, as *history congealed*. And just as kinship is geography, so the lives of persons and the histories of their relationships can be traced in the textures of the land.

Conclusion

> Indigenous peoples regard all products of the human mind and heart as interrelated, and as flowing from the same source: the relationships between the people and their land, their kinship with the other living creatures that share the land, and with the spirit world. Since the ultimate source of knowledge and creativity is the land itself, all of the art and science of a specific people are manifestations of the same underlying relationships, and can be considered as manifestations of the people as a whole.

So writes Erica-Irene Daes on behalf of the Working Group on Indigenous Populations, which was established in 1982, under the auspices of the United Nations, to hear the views of the representatives of such populations on the issue of the protection of their collective 'heritage' (Daes 1997: 3). In this passage she offers a cogent and succinct restatement of the relational perspective. Yet it also contradicts, point by point, the 'official' definition of what it means to be indigenous, with which I began. To recapitulate: this definition classifies as indigenous the descendants of people who were already inhabiting some country or region at the time when colonists arrived from elsewhere. The axiom, formulated so clearly by Daes, that indigenous peoples draw their being from their relationships with the land, is here brushed aside in favour of a claim based purely and simply on proof of prior presence, judged in terms of a linear concept of time and history.

The fact that a certain region was home to a population of human beings prior to its colonial settlement tells us nothing about how these 'original inhabitants' understood their relationships to the land. They may of course have felt themselves to have been connected to other components of the lifeworld in the way the relational model suggests. But for contemporary people to claim indigenous status on the criterion of *descent* from this ancestral population is tantamount to an admission that for them, 'living in the land' is no more than a distant memory. For the principle of descent implies, as we have seen, that people do *not* draw their substance and knowledge from the land, or from their relationships with it, but rather from their immediate genealogical antecedents. At the same time it rules out the possibility of any real kinship with other creatures that share the land, and reduces the activity of dwelling to mere occupancy. In short, the appeal to descent as a basis on which to ascribe indigenous identity contravenes those very understandings that for the indigenous groups themselves, are most fundamental to their way of life. Indeed it seems that a sense of being founded on people's relationships to the land is bound to be compromised by its articulation in terms of a model that treats these relationships as no more than epiphenomena of genealogically transmitted, biogenetic and cultural attributes.

To describe indigenous people as those who were 'there first' is to situate them within a history conceived as a narrative of colonial conquest and state formation. It is a designation, as André Béteille comments, that 'acquires substance when there are other populations in the same region that can reasonably be described as settlers or aliens' (1998: 188). In the eyes of the settlers who went on to take possession of their lands, these earlier inhabitants may well have seemed like archetypal 'natives'. In a sense, then, the official definition of indigenous status faithfully reflects the self-perception of the non-indigenous populations of nation states, as descendants of settlers who founded the nations they represent on alien soil. In these terms, contemporary indigenes are descendants of the colonially dispossessed. Indeed the categorical opposition of indigenous and non-indigenous populations, conceived respectively as the descendants of natives and settlers, is itself a construction of colonialism. For the genealogical model is fundamentally a colonial model, with its notion of the land as a surface to be occupied, of the lifeworld as a country to which people can move in order to take up residence, bringing their endowments of heritable substance and knowledge with them, and of generation as serial replacement, such that the present takes over from, and extinguishes, the past.

To conclude: we are left with the question of why people should feel the need to articulate claims to indigenous status in terms that, by their own accounts, are incompatible with their experience and understanding of the world. The answer, I believe, is that these people are compelled to operate in a modern-day political context in which they are also citizens of nation states. The genealogical model is deeply implicated in the discourse of the state: indeed it is the principal source of legitimation for the state's sovereign entitlement to defend and administer its territory in the name of the nation. For the state, the land belongs to the national heritage, and is held in trust by each generation of citizens on behalf of their descendants. If it is by appeal to common heritage that the citizens of the state are made to appear the same – that is, to share a national identity – then only by stressing their separate heritage can encapsulated groups express their difference. The construction of indigenous status upon the principle of descent is thus, as I have argued elsewhere, 'a product of the representation of difference in the discourse of homogeneity' (Ingold 1993a: 218). In this construction, the very relationships within which persons are positioned and from which they derive their identity and belonging are recast as the outward expressions of inner, inherited properties or attributes that *belong to them*. It is in the attempt to recover a lost or threatened sense of relational identity in attributional terms that people come to define themselves, and to be defined by others, as 'indigenous'.

Part II

Dwelling

INTRODUCTION

The chapters in this part explore various aspects of what I have called the *dwelling perspective*. By this I mean a perspective that treats the immersion of the organism-person in an environment or lifeworld as an inescapable condition of existence. From this perspective, the world continually comes into being around the inhabitant, and its manifold constituents take on significance through their incorporation into a regular pattern of life activity. It has been rather more usual, in social and cultural anthropology, to suppose that people inhabit a world – of culture or society – to which form and meaning have already been attached. It is assumed, in other words, that they must perforce 'construct' the world, in consciousness, before they can act in it. I refer to this view as the *building perspective*. Each chapter explores some aspect of the contrast between the building and dwelling perspectives, in relation to such topics as the significance of architecture, the perception of the landscape, the idea of environmental change, the practice of wayfinding, and the properties of vision and hearing. In order to lay a foundation for these explorations, however, I begin in Chapter Nine with a general introduction to anthropological theories of perception and cognition. The fundamental question that all such theories seek to address is the following: why should people from different cultural backgrounds perceive the world in different ways?

In the first part of the chapter I outline the history of anthropological attempts to answer this question, starting with the classical work of Emile Durkheim, through influential statements by Edmund Leach, Clifford Geertz and Mary Douglas, to the more recent development of the field known as cognitive anthropology. Throughout this history, the assumption has persisted that people construct the world, or what for them is 'reality', by organising the data of sensory perception in terms of received and culturally specific conceptual schemata. But in recent anthropology, this assumption has been challenged by advocates of 'practice theory', who argue that cultural knowledge, rather than being imported into the settings of practical activity, is constituted within these settings through the development of specific dispositions and sensibilities that lead people to orient themselves in relation to their environment and to attend to its features in the particular ways that they do. In the second part of Chapter Nine, I assess the relevance for anthropological understanding of alternative approaches drawn from cognitive science, ecological psychology and phenomenology. Though my conclusion is that anthropology has more to gain from an alliance with ecological psychology than with cognitive science, and that such an alliance accords well with a phenomenology of dwelling, there are still problems to be faced in overcoming the dichotomy between culture and biology, in reconciling a

phenomenology of the body with an ecology of mind, and in translating the overall theoretical perspective into a practicable programme of research.

Chapter Ten explores how a dwelling perspective might affect our understanding of the similarities and differences between the ways in which human beings and other animals create environments for themselves. I am concerned, in particular, with the meaning of architecture, or that part of the environment conventionally described as 'built'. I start by documenting the transition in my own thinking from a 'building perspective', according to which worlds are made before they are lived in, to a 'dwelling perspective', according to which the forms people build, whether in the imagination or on the ground, only arise within the current of their life activities. Drawing on Jakob von Uexküll's notion of *Umwelt*, I show how we might distinguish between human and non-human constructions in the terms of the building perspective, on the basis of the presence or absence of an intentional project of design. This argument, however, implies the existence of some kind of threshold in human evolution, beyond which our ancestors were able to author their own projects. This idea has motivated the search for a point of origin for humanity in general, and for human architecture in particular. Through the adoption of a dwelling perspective, influenced by the philosophy of Martin Heidegger, I show that the point of origin is illusory. There can, then, be no absolute distinction between 'natural' and 'artificial' structures. Buildings, like other environmental structures, are never complete but continually under construction, and have life-histories of involvement with both their human and non-human inhabitants. Whether, at a certain point in its life history, a structure looks to us like a building or not will depend on the extent and nature of human involvement in its formation.

In Chapter Eleven I turn to what I consider to be the unifying themes of archaeology and sociocultural anthropology: namely, landscape and temporality. This chapter is an attempt to show how the temporality of the landscape might be understood by way of a dwelling perspective. I first set out to clarify the meaning of 'landscape' by contrast to the concepts of land, nature, space and environment. I then introduce the notion of 'taskscape' to denote a pattern of dwelling activities. The intrinsic temporality of the taskscape, I argue, lies in its rhythmic interrelations or patterns of resonance. At first glance the opposition between landscape and taskscape seems to mirror that, in the field of art, between painting and music. However by considering how taskscape relates to landscape, the distinction between them is ultimately dissolved, and the landscape itself is shown to be fundamentally temporal. I illustrate the thesis of the temporality of the landscape through an analysis of the scene depicted by Pieter Bruegel the Elder in his painting *The harvesters*. In conclusion, I criticise the view that a properly cultural ecology would be one that would go beyond strictly pragmatic concerns with the conditions of adaptation to focus on the multiple layers of symbolic meaning with which people cover over their environments. For meaning, I contend, does not cover the world but is immanent in the contexts of people's pragmatic engagements with its constituents. But the discovery of meaning in the landscape has to begin from a recognition of its temporality, and in this lies the essence of archaeological investigation.

The significance of the contrast between building and dwelling perspectives for cosmological conceptions of 'the earth' is my theme in Chapter Twelve. I argue that the image of the earth as a globe, implied in such phrases as 'global environmental change', is one that actually expels humanity from the lifeworld, such that rather than the environment surrounding *us*, it is we who have surrounded *it*. Far from reintegrating human society into the world of nature, the idea of the earth as a solid globe of opaque materiality marks

their final separation. Thus the biodiversity of locally distributed life-forms presents itself to a universal, globally distributed humanity. The conservation ethic entailed in such a global vision, which places nature on the inside and humanity on the outside, is at once eco*centric* and anthropo*circumferential*. Against this, I examine the contrasting image of the sphere, conjuring up a transparent lifeworld which is perceived by its inhabitants from within. This image, which is characteristic of the cosmologies of pre-modern societies, is genuinely anthropocentric, but in a way that counterposes neither humanity and nature, nor the local and the global. I show how the shift from a spherical to a global perspective marks the triumph of technology over cosmology. But it also leads to the systematic disempowerment of local communities, taking from them – in the name of preserving biodiversity – the responsibility to care for their own environments.

From my discussion of the landscape and of the topological image of the globe in Chapters Eleven and Twelve, it is clear that in the building perspective (as in the genealogical model of Chapter Eight) the earth is presented to humanity as a surface to be occupied rather than a world to be inhabited. It is further supposed that the disposition of things and places on this surface is known by representing it, either in the mind or on paper, in the form of a map. Thus to know where one is entails identifying one's current position with a corresponding location on the map, and to find one's way from one position to another is to navigate by means of it. In Chapter Thirteen I take a critical look at the notion of the map, and its application in anthropological studies of wayfinding and navigation. I argue that while dwelling in the world entails movement, this movement is not between locations in space but between places in a network of coming and going that I call a region. To know one's whereabouts is thus to be able to connect one's latest movements to narratives of journeys previously made, by oneself and others. In wayfinding, people do not traverse the surface of a world whose layout is fixed in advance – as represented on the cartographic map. Rather, they 'feel their way' *through* a world that is itself in motion, continually coming into being through the combined action of human and non-human agencies. I develop a notion of mapping as the narrative re-enactment of journeys made, and of maps as the inscriptions to which such re-enactments may possibly give rise. However, the building perspective enshrined in modern science splits mapping into the phases of mapmaking and map-using, and likewise splits wayfinding into the twin projects of cartography and navigation.

In Chapter Fourteen I turn to a problem in the anthropology of the senses. Does a building perspective imply the hegemony of vision? Is hearing the predominant sense of dwelling? To regain an appreciation of human dwelling in the world is it necessary to rebalance the sensorium, giving greater weight to the ear, and less to the eye, in the ratio of the senses? Many philosophers and historians have noted the 'ocularcentrism' of the Western tradition, its privileging of sight over the other senses as a source of human knowledge. Anthropologists, for their part, have stressed the importance of hearing in the sensorium of many non-Western peoples. Yet the comparison remains couched in terms of a dichotomy between vision and hearing whose roots lie firmly in the intellectual history of the West. In the terms of this dichotomy, vision is distancing, objectifying, analytic, and atomising; hearing is unifying, subjective, synthetic and holistic. Vision represents an external world of being, hearing participates in the inwardness of the world's becoming: the former is inherently static, the latter suspended in movement. Whereas one hears sound, one does not see light, but only the things off whose surfaces light is reflected. This is why hearing is supposed to penetrate the inner, subjective domain of thought and feeling in a way that vision cannot. It is also why Western thought, for all its dependence

on the written word, and in apparent contradiction to its elevation of sight as the 'noblest' of the senses, has tended to treat writing (which is seen) as inferior to speech (which is heard).

But ethnography suggests that people in non-Western societies do not regard vision and hearing as radically opposed, but rather as virtually interchangeable. Nor does their apparent emphasis on understanding through sensory participation rather than external observation entail a bias towards hearing over vision. For many, vision remains paramount. But it is a vision that is non-representational, a matter of watching rather than seeing. Like hearing, it is caught in the flow of time and bodily movement. One can, in short, dwell just as fully in the world of visual as in that of aural experience: indeed for the most part these worlds are one and the same. That this point has been missed in the anthropology of the senses is due to its tendency to treat sensory experience as but a vehicle for the expression of extra-sensory, cultural values. The key question, I conclude, is: what is the relationship between the cultural evaluation of the senses and the ways in which they are practically deployed in acts of perception?

Culture, perception and cognition

There is one question that, perhaps more than any other, motivates anthropological inquiry. Take people from different backgrounds and place them in the same situation; they are likely to differ in what they make of it. Indeed such difference is something that every anthropologist experiences in the initial phases of fieldwork. But why should this be so? How do we account for it? In their attempts to answer this question, anthropologists have come up against some of the most contested issues in the psychology of perception and cognition. My purpose in this chapter is to show how they have dealt with these issues. The chapter is divided into two parts. In the first part I trace something of the history of the problem over the past century of anthropological thought. In the second, I go on to assess the relevance for anthropological understanding of alternative approaches drawn from cognitive science, ecological psychology and phenomenology. This is a considerable agenda, and in the space of a single chapter I can do no more than touch on the many questions raised.

<div align="center">I</div>

SOCIAL ANTHROPOLOGY

In British social anthropology (as distinct from American cultural anthropology) thinking about perception and cognition goes back to the classical work of Emile Durkheim, himself one of the founding fathers of what was then the new science of sociology. In his manifesto for the new discipline, *The rules of sociological method* (first published in 1895), Durkheim adamantly opposed all attempts to explain social phenomena in terms of the psychological properties of individuals. As he famously declared, 'every time a social phenomenon is directly explained by a psychological phenomenon, we may rest assured that the explanation is false' (1982[1895]: 129). If sociology is a kind of psychology, Durkheim thought, its object of study must be the mind of society, not of the individual. This mind, the consciousness of the collectivity, was supposed to have emergent properties of its own, in no way reducible to the given properties of individuals as inscribed in human nature. But it was not until the concluding chapter of his greatest work, *The elementary forms of the religious life*, that Durkheim explicitly spelled out the relation between the consciousness of the individual and that of the collectivity – 'the highest form of the psychic life' (1976[1915]: 444). He did so in terms of a thoroughgoing distinction between sensation and representation.

The distinction was made on two grounds. The first lies in the contrast between the ephemerality of sensations and the durability of representations. Every sensation, Durkheim

argued, is tied to a particular moment that will never recur, for even if – at a subsequent point in time – the thing perceived has not changed, the perceiver will no longer be the same. We are nevertheless able to represent our experience, and so to know what we have perceived, by catching perceptual images that would otherwise float by on the stream of consciousness within the mesh of a system of concepts that remains somehow aloof from this sensory agitation (in a 'different portion of the mind', Durkheim suggested, that is more calm and serene). Like language, which is the medium in which concepts are expressed ('for every word translates a concept'), the conceptual system has a kind of stability: it endures, whilst the stream of consciousness flows on (Durkheim 1976[1915]: 433).

Secondly, whereas sensations are private and individual, representations are public and social. Since sensations consist in the reactions of the organism to particular external stimuli, there is no way in which a sensation can be made to pass directly from one individual consciousness to another. If people are to share their experiences they must talk about them, and to do that these experiences must be represented by means of concepts, which in turn may be expressed in words whose meanings are established within a community of speakers by verbal convention. Thus collective representations serve as a kind of bridge between individual consciousnesses that are otherwise closed to each other, furnishing them with a means of mutual understanding. 'The concept is an essentially impersonal representation; it is through it that human intelligences communicate' (Durkheim 1976[1915]: 433–4).

Following Durkheim's lead, British social anthropologists carried on with the comparative study of collective representations – otherwise known as 'social structures' – without paying much attention to the psychological premises on which such study rested. Fifty years later, two of the most influential social anthropologists of the day, Edmund Leach and Mary Douglas, could still pose the problem of perception and cognition in very much the same terms. Given that the world of our immediate, sensory experience is a formless and continuous flux in which nothing is the same from one moment to the next, how can we know what we perceive? To recognise specific objects and events in the external world, Leach claimed, the flux has to be cut up into bounded chunks: thus thought fragments the continuum of life as it is lived, and the diversity of culture lies precisely in the manifold ways in which the continuum can be cut. Leach's first explicit statement of this theory of perception and cognition was presented in an article on 'Anthropological aspects of language', published in 1964. Here he argued that the categories of language provide the 'discriminating grid' which, laid over the continuous substrate of raw experience, enables the speaker to tell one thing from another, and so to see the world 'as being composed of a large number of separate things, each labelled with a name' (1964: 34). As the child learns its mother-tongue, thereby taking on board a conventional system of named categories, so its environment literally takes shape before its very eyes.

Two years later, Mary Douglas published her seminal study, *Purity and danger*. Here, too, we find the same basic idea: that in perception the world is constructed to a certain order, through the imposition of culturally transmitted form upon the flux of experience.

As perceivers we select from all the stimuli falling on our senses only those that interest us, and our interests are governed by a pattern-making tendency . . . In a chaos of shifting impressions, each of us constructs a world in which objects have recognisable shapes, are located in depth, and have permanence.

(1966: 36)

As with Leach, the roots of Douglas's thinking lie in Durkheim's theory of knowledge. This theory, as we have seen, effectively divides the human subject into two mutually exclusive parts. One part, fully immersed in the sensate, physical world, is continually bombarded by stimuli which are registered in consciousness as a 'chaos of shifting impressions'. The other part, however, stands aside from this engagement, and is untouched by it. Here are located the conceptual categories that sort the sensory input, discarding or suppressing some elements of it while fitting the remainder into a pre-existing, socially approved schema. Crucially, then, perception is a two-stage phenomenon: the first involves the receipt, by the individual human organism, of ephemeral and meaningless sense data; the second consists in the organisation of these data into collectively held and enduring representations.

Cultural anthropology

The rigid distinction between social and psychological phenomena that British social anthropology took from Durkheim was not matched by the parallel, North American tradition of cultural anthropology. The founder of this latter tradition, Franz Boas, consistently adopted the position that the patterned integration of culture, as a system of habits, beliefs and dispositions, is achieved on the level of the individual rather than having its source in some overarching collectivity, and is therefore essentially psychological in nature. Accordingly, American cultural anthropologists of the mid-twentieth century paid a great deal of attention to the way in which the individual personality is fashioned out of the cultural materials available to it. In two respects, however, subsequent developments led to the establishment of a view of perception and cognition more closely in line with that espoused by British writers. The first lay in the separation of culture, as a body of transmissible knowledge, from patterns of observable behaviour. Already in the writings of Clyde Kluckhohn, and in the review of concepts of culture that Kluckhohn compiled in collaboration with Alfred Kroeber, we find a stress on culture as an internalised system of rules and meanings *as distinct* from manifest behaviour patterns and their artefactual products (Kluckhohn 1949: 32, Kroeber and Kluckhohn 1952: 114). And in 1957, Ward Goodenough confirmed this separation in his much cited definition of culture as 'whatever it is one has to know or believe in order to operate in a manner acceptable to [a society's] members' (cited in D'Andrade 1984: 89).

The distinction between culture and behaviour was once again reiterated, this time by Clifford Geertz, in an influential article first published in 1966, on 'The impact of the concept of culture on the concept of man'. Culture, Geertz argued, 'is best seen not as complexes of concrete behavior patterns – customs, usages, traditions, habit clusters – . . . but as a set of control mechanisms – plans, recipes, rules, instructions (what computer engineers call "programs") – for the governing of behavior' (Geertz 1973: 44). He nevertheless took strong exception to the view, attributed to Goodenough, that the place to find these control mechanisms is inside the heads of individuals.[1] Herein, then, lay the second development: having split culture from behaviour, the former was removed from the minds of individuals and reinscribed on the level of the collectivity. In a move redolent of Durkheim's earlier formulation, Geertz insisted that the domain of cultural symbols is social rather than psychological, public rather than private. Their natural place of abode is in the intersubjective space of social interaction – 'the house yard, the marketplace, and the town square' – whence they are 'used to impose meaning upon experience' (1973: 44–5). For any one individual, the range of symbolic meanings which can be drawn upon

is more or less given by what is current in the community into which he or she is born. But without the guidance provided by significant symbols, human beings would be hopelessly lost, unable to establish their bearings in the world. For unlike other creatures whose activities are more closely controlled by innate response mechanisms, humans depend on a substantial input of additional information, learned rather than innate, in order to function adequately in their normal environments. 'Undirected by culture patterns – organized systems of significant symbols – man's behavior would be virtually ungovernable, a mere chaos of pointless acts and exploding emotions, his experience virtually shapeless' (Geertz 1973: 46).

Despite his different intellectual roots, in American cultural anthropology rather than British social anthropology, Geertz came to conclusions remarkably similar to those that were being drawn at the same time by Douglas, and that I have already touched upon. Both Geertz and Douglas took culture to comprise a framework of symbolic meanings, common to a community and relatively impervious to the passage of time and generations, which gives shape to the raw material of experience and direction to human feeling and action. Thus to return to our original question: if two individuals from different backgrounds, placed in the same environment, construe it in different ways, the reason would be that each has brought a different symbolic system to bear in organising the same material of sensory experience. Granted, then, that every community has its own particular system for the organisation of experience, anthropological attention naturally came to focus on cultural variation in the organisational principles involved. Geertz, as we have seen, claimed that such principles were to be found in the publicly accessible space of social discourse, and not in the interiority of the mind. But others, taking their cue more directly from Goodenough, insisted that cultural cognition can only take place by way of shared conceptual schemata lodged in the minds of individuals. Their aim was to uncover these schemata, and it gave rise, in the late 1960s, to a field of inquiry known rather generally as 'cognitive anthropology', though in a narrower and more restricted form as 'ethnoscience' (Tyler 1969).

COGNITIVE ANTHROPOLOGY

The problem for the cognitive anthropologist, Tyler explains, 'is to discover how other people create order out of what appears to him to be utter chaos' (1969: 6). They do so, it is supposed, by grouping the infinitely variable phenomena of the experienced world into a finite set of named, hierarchically ordered classes. This is done by attending only to those perceptual cues that differentiate things as belonging to one class rather than another, while ignoring those that would indicate the uniqueness of every member of a class. But the ordering principles that govern this process of selective attention are given in the mind, not in the world. 'There is nothing', Tyler asserts, 'in the external world which demands that certain things go together and others do not' (1969: 7). In other words, the principles of classification are arbitrary and subjective with regard to the world whose phenomena are to be classified. They are to be discovered through the formal analysis of responses provided by native informants to a series of questions of the form 'is this thing here a kind of X?', 'what other kinds of X are there?', 'is X a kind of Y?', and so on, all of which are designed by the investigator to elicit precisely the distinctions he or she is looking for.

Despite early promise, the project of cognitive anthropology soon ran into difficulties. An enormous amount of effort was put into mapping out rather limited semantic domains

– for example of kinship terms, plant and animal taxonomies or colour classifications – without bringing any comparable advance in understanding how people actually negotiate their relationships with one another, and with their non-human environments, in the usual course of everyday life. It became apparent that the key to such negotiation lay in a certain flexibility in the use of concepts and a sensitivity to context that was disregarded by formal semantic analysis. The neatly ordered paradigms and taxonomies yielded by this method of analysis seemed to be artefacts of anthropologists' techniques of controlled elicitation rather than having any counterpart in the cognitive organisation of the people studied. The specialised tasks of naming and discrimination that the latter were expected to perform were not, after all, ones that they would have ordinarily encountered. Indeed the ability to name things correctly is but a small and relatively insignificant part of what a person needs to know in order to get by in the world, so that the greater part of cultural knowledge had still to be uncovered. Above all, cognitive anthropology was unable to grasp the source of human motives: one learned no more from an analysis, say, of kinship terminology about people's feelings for one another than one might learn from the grammar of a language about why its speakers say the things they do.

In recent years, and partly in response to these objections, cognitive anthropology has resurfaced in a new guise, as the investigation of what are now called 'cultural models'. Introducing a seminal volume of essays on *Cultural models in language and thought*, Naomi Quinn and Dorothy Holland define such models as 'presupposed, taken-for-granted models of the world that are widely shared . . . by the members of a society and that play an enormous role in their understanding of that world and their behaviour in it' (1987: 4). They differ from the classificatory schemas identified by earlier cognitive anthropologists in three major ways. First, rather than dividing up the continuum of experience into named categories, cultural models offer a description of the world framed in terms of networks of interconnected images or propositions, in which objects, events and situations take on regular, prototypical forms. Actual experience in the real world is then organised by matching it to the prototypical scenarios built into the simplified worlds of the cultural models, and these, in turn, furnish conventional guidelines for action. Secondly, although linguistic data provide important clues to underlying cultural knowledge, it cannot be assumed that word meanings stand to components of the cultural model in a simple relation of one-to-one correspondence. The relation is rather complex and indirect, and can only be grasped through an analysis of the richly textured material of ordinary discourse. Thirdly, cultural models – to the extent that they are fully internalised – do not merely describe or represent the world, they also shape people's feelings and desires. That is to say, they can have 'motivational force' (D'Andrade 1992: 28). As Claudia Strauss argues, in her introduction to a recent volume dedicated to the demonstration of this point, the realm of cognition is inseparable from the realm of affect; thus cultural models should be understood as 'learned, internalised patterns of thought-feeling' (Strauss 1992: 3).

Despite these fairly radical revisions, the programme of cognitive anthropology remains basically unchanged. Starting from the premise that culture consists in a corpus of inter-generationally transmissible knowledge, as distinct from the ways in which it is put to use in practical contexts of perception and action, the objective is to discover how this knowledge is organised. Moreover the assumptions on which the programme rests are much as they were in Durkheim's day. They are that cognition consists of a process of matching sensory experience to stable conceptual schemata, that much if not all of the order that people claim to perceive in the world – and especially the social world – is imposed by the mind rather than given in experience, that people are able to understand one another

to the extent that their cultural orderings are founded on consensus (such that the limits of consensus define the boundaries of society), and that the acquisition of such orderings involves a process of internalisation. These assumptions have not, however, gone unchallenged – indeed there is a powerful movement within contemporary anthropology that would reject them altogether. One of the most influential figures in this movement has been Pierre Bourdieu, who in a series of works has attempted to show how cultural knowledge, rather than being imported by the mind into contexts of experience, is itself generated within these contexts in the course of people's involvement with others in the practical business of life. Through such involvement, people acquire the specific dispositions and sensibilities that lead them to orient themselves in relation to their environment and to attend to its features in the particular ways that they do. These dispositions and sensibilities add up to what Bourdieu calls the *habitus* (1990: 52–65).[2]

The theory of practice

Like the 'cultural model' of cognitive anthropology, the *habitus* of Bourdieu's theory of practice could be described as a pattern of thought-feeling. The similarity ends there, however. For thinking and feeling, in Bourdieu's account, do not go on in an interior subjective (or intersubjective) space of images and representations but in the space of people's actual engagement in the settings of practical activity. Whereas cultural models are supposed to exist independently of, and prior to, their application in particular situations of use – such as in doing things or making things, or in the interpretation of experience – the *habitus* exists only as it is instantiated in the activity itself. In other words, the *habitus* is not expressed in practice, it rather *subsists* in it.[3] What Bourdieu has in mind is the kind of practical mastery that we associate with skill – a mastery that we carry in our bodies and that is refractory to formulation in terms of any system of mental rules and representations. Such skill is acquired not through formal instruction, but by routinely carrying out specific tasks involving characteristic postures and gestures, or what Bourdieu calls a particular body *hexis*. 'A way of walking, a tilt of the head, facial expressions, ways of sitting and of using implements' – all of these, and more, comprise what it takes to be an accomplished practitioner, and together they furnish a person with his or her bearings in the world (Bourdieu 1977: 87). And if people from different backgrounds orient themselves in different ways, this is not because they are interpreting the same sensory experience in terms of alternative cultural models or cognitive schemata, but because, due to their previous bodily training, their senses are differentially attuned to the environment.

   In the anthropological study of cognition this kind of approach is perhaps best represented in the work of Jean Lave. Her book *Cognition in Practice* (1988) is a manifesto for an 'outdoor psychology' – that is, a psychology that would take as its unit of analysis 'the whole person in action, acting within the settings of that activity' (1988: 17). Cognition, in Lave's view, is not a process that goes on 'inside the head', whose products are representations that bear some complex relation to the world outside, but rather a social activity that is situated in the nexus of ongoing relations between persons and the world, and that plays its part in their mutual constitution. It is a process wherein both persons, as knowledgeable social agents, and the settings in which they act, continually come into being, each in relation to the other. Thus thinking is inseparable from doing, thought is 'embodied and enacted', and cognition is 'seamlessly distributed across persons, activity and setting' (1988: 171). To study cognition is to focus on the *modus operandi* not of the mind, in organising the bodily data of sense, but of the whole body-person in

the business of dwelling in the world. And if knowledge is shared it is because people work together, through their joint immersion in the settings of activity, in the process of its formation.

What, then, becomes of the models and schemata of the cognitive anthropologists? Are they merely artefacts of analytic abstraction, products of attempts by anthropological observers to represent manifest behaviour as the output of formal programmes? Or do they, to the contrary, offer clues to basic truths about the way the human mind works? The answers to these questions hinge on more fundamental differences of approach which divide psychologists as much as anthropologists. Roughly speaking, the division is between advocates of cognitive science on the one hand, and their critics on the other, who find inspiration in an ecological or phenomenological perspective on perception and cognition. These differences of approach, and some of their implications for anthropology, are reviewed in the next part of this chapter.

II

Cognitive science

In the field of psychology, cognitive science emerged as an alternative to behaviourism in the 1950s, alongside the development of the digital computer. Its founding axioms are that people come to know what is 'out there' in the world by representing it in the mind, in the form of 'mental models', and that such representations are the result of a computational process working upon information received by the senses. The functioning of the mind, then, can be compared to the operation of a computer program, and the relation between mind and brain to that between the program and the 'hardware' in which it is installed (Johnson-Laird 1988). But the computing analogy also found its way into cognitive anthropology – I have already referred to Geertz's (1973: 44) likening of cultural control mechanisms to computer software – where it was similarly supposed that the mind is equipped with programmes that construct internal representations of the environment from the data of sensation, and deliver appropriate plans for action (D'Andrade 1984: 88–9). Whereas cognitive scientists, however, have by and large been concerned to discover universals of human cognition, which are attributed to innate structures established in the course of evolution under natural selection, cognitive anthropologists have sought to account for human perception and action in terms of acquired schemata or programmes that differ from one culture to another.

How, then, should we view the relation between these two projects? Are they contradictory or mutually compatible? D'Andrade (1981: 181–2) tackles this issue by considering the fit between *programmes* and *processors*. By programmes he means the informational content of transmitted culture – what is 'passed along' from generation to generation. By processors he means the apparatus of acquisition that makes such transmission possible, an apparatus that is assumed to be common to all human minds. According to this division, cognitive anthropology is concerned with the diversity of cultural content, and with the way in which its organisation is constrained by invariant properties of the processing devices that govern its acquisition, while cognitive psychology is concerned with the structure and functioning of the devices themselves, and the way in which they work on all kinds of information (including cultural information). This formulation, however, begs a critical question. Granted that mental representations are the products of a

processing of information by acquired cultural programmes, what is the source of the processing apparatus of which these programmes are themselves products? This apparatus, it seems, must already be in place prior to the acquisition of culture; hence its design and operation must be innately specified. In short, the theory that all human cognition is grounded in culturally specific schemata can hold only on condition that human beings come universally pre-equipped with the structures necessary to enable these schemata to be acquired in the first place.

This is precisely the conclusion reached by Dan Sperber (1985), in the context of his critique of cultural relativism – the doctrine, long ascendant in anthropology, that people in different cultures inhabit different cognitive (or rather, cognisable) worlds, each with its own criteria of rationality and judgement. Relativists argue that just as every non-human animal species, depending on its evolved cognitive organisation, can only know the world in its own particular way, so also every human culture is locked into the cognitive framework of a unique worldview. But whereas species differences supposedly have a genetic basis, cultural differences are assumed to be entirely independent of genetic constraint. Thus cultural relativists tend to imagine that theirs is a position opposed to an innatist view of the human mind, and that evidence for the diversity of incommensurate worldviews only goes to prove that the underlying structures of human cognition are genetically underdetermined and malleable to the effects of experience.

Yet in this, Sperber shows, they are mistaken. Relativists, he contends, have failed to attend to the psychological implications of their assumption that human behaviour is rooted in tradition rather than heredity. Had they done so, they would have realised that a creature capable of taking on not just one form of life but *any one* of a very large number of possible alternative forms would require more rather than less by way of innate programming. On the basis of a formal logical argument, Sperber concludes that 'the greater the diversity of the cultures that humans are capable of acquiring, the greater the complexity of the innate learning abilities involved' (1985: 43). Thus the relativists' appeal to human cultural diversity is not at all contrary to the universalist claims of cognitive science; rather it depends upon them.

Though the logic of Sperber's argument may be impeccable, it rests on a foundation that is far from secure – namely, that cultural knowledge takes the propositional (or semi-propositional) form of *beliefs*, 'representations acquired through social communication and accepted on the ground of social affiliation' (1985: 59). Underlying the commonsense understanding of the culturally competent actor is supposed to lie a huge database of such representations, which provide all the information necessary to generate appropriate responses under any given environmental circumstances. Yet as many critics of cognitive science have pointed out, and as the failure of attempts to replicate human skills in the design of expert systems has amply demonstrated (Dreyfus and Dreyfus 1987), even the simplest and most routine of everyday tasks are refractory to codification in propositional form. By and large, these tasks are not represented (save in the notebooks of observers), nor are such representations communicated in learning situations. Most cultural learning takes place through trial-and-error and practice, albeit in socially structured situations, and although beginners may need to follow rules, these rules structure the situation of learning and do not themselves form any part of the content of what is learned. For the skilled practitioner consults the world, rather than representations (rules, propositions, beliefs) inside his or her head, for guidance on what to do next.[4] As Andy Clark puts it, why should we go to the trouble of modelling the world when 'we can use the world as its own best model' (Clark 1997: 29–30, see also Chapman 1991: 20)?

Faced with the evident artificiality of depicting cultural knowledge in algorithmised form as a set of programmes, acquired by means of a processing device that is somehow constituted in advance of ontogenetic development, cognitive science has come up with an alternative model of the way the mind works. Instead of positing one giant processor with a massive capacity for information storage and retrieval, it is suggested that the mind consists of a very large number of small, simple processors, massively interconnected, all operating in parallel, and receiving inputs and delivering outputs to each other along the countless pathways linking them. Crucially, a system so constituted can learn from experience, not by taking on new informational content, but by adjustments to the differential strengths of the connections among processing units. In other words, knowledge is acquired through the establishment of particular patterns of connection: any processor may therefore be involved in the representation of diverse experiences; conversely the representation of any experience may be distributed across many processors (Johnson-Laird 1988: 174). This so-called 'connectionist' model of the mind has a certain anthropological appeal – thus cognitive anthropologists such as D'Andrade (1990: 98–9) have noted that the properties of cultural models are precisely what would be expected from the operation of parallel processing networks, while Bloch (1991) has suggested that the acquisition of practical skills may best be understood in terms of the development of tightly connected networks dedicated to particular domains of cognition (for a more extended review, see D'Andrade 1995: 143–9).

Despite its greater realism, connectionism remains open to much the same criticisms that have been levelled against earlier versions of artificial intelligence (Dreyfus 1992). For ultimately, it is still grounded in the Cartesian ontology that is basic to the entire project of cognitive science – an ontology that divorces the activity of the mind from that of the body in the world. Thus the body continues to be regarded as nothing more than an input device whose role is to receive information to be 'processed' by the mind, rather than playing any part in cognition itself. And beyond that, the world is supposed to exist as a domain of problems to be solved, or as a field for the enactment of solutions reached, rather than as a resource for problem solving (Clark 1997: 83–4). Connectionists, Clark admits, 'inherit a distressing tendency to study disembodied problem solving and to opt for abstract, symbolically defined input-output mappings' (1997: 80). What they fail to recognise is that the processing loops that yield intelligent action are not confined to some interior space of mind, confined within the skull, but freely penetrate both the body and its environment. This failure is deeply rooted in the history of twentieth-century psychology. It lies, as Edward Reed (1987: 144–5) has shown, in the founding assumptions of the behaviourist theory that cognitive science claims to have overthrown: namely that perception is based on discrete bodily sensations touched off by external stimuli, and that action is based on the corresponding bodily responses.

The objection to behaviourism was that, as a theory, it was incomplete: the simple linkage of stimulus and response was considered insufficient to account for the knowledgeability of actors or the productivity of their actions. To complete the picture, cognitive scientists posited a mental processing device that would convert the stimulus input into knowledge, and generate plans for the delivery of meaningful responses. There is however another way out of behaviourism, and this is to treat the perceiving organism not as a passive recipient of stimuli but as an active agent who purposively seeks out information that would specify the meaningful properties of his or her environment. This was the path taken by James Gibson in his pioneering studies of visual perception, and in doing so he laid the foundations for an approach, known as 'ecological psychology', which is radically

opposed, in almost every respect, to the project of cognitive science.

ECOLOGICAL PSYCHOLOGY

The point of departure for ecological psychology is the proposition that perceptual activity consists not in the operation of the mind upon the bodily data of sense, but in the intentional movement of the whole being (indissolubly body and mind) in its environment. The emphasis on movement is critical. Cognitive science assumes a static perceiver who has nothing to go on but transient patterns of sensory excitation that are, in themselves, quite insufficient to specify the objects and events that gave rise to them. Thus the problem of perception, for the cognitive scientist, is to show how these ephemeral and fragmentary sense data are reconstructed, in terms of pre-existing schemata or representations, into a coherent picture of the world. But for Gibson, sensations do not, as such, constitute the data for perception (Gibson 1979: 55). Rather, what the perceiver looks for are constancies underlying the continuous modulations of the sensory array as one moves from place to place. In visual perception, for example, we do not see patterns of light but objects in our environment. We do so because, as we move about, the pattern of light reaching the eyes from reflecting surfaces in the environment (that is, the 'optic array') undergoes a gradual transformation. It is the invariants that underlie this transformation, and not the momentary patterns of stimulation themselves, that specify what we see. Indeed it is Gibson's contention that the invariant relations that structure the modulations of an optic array for a moving observer contain all the information necessary to specify the environment. Perception, then, is a matter of extracting these invariants. The perceiver has no need to reconstruct the world in the mind if it can be accessed directly in this way.

Certain implications follow. First, if perception entails movement, then it must be a mode of action rather than a prerequisite for action. For Gibson, perception is an active and exploratory process of information pickup; far from working on sensations already received, it involves the continual movement, adjustment and reorientation of the receptor organs themselves. What is important, he argues, 'is the looking, listening, touching and sniffing that goes on when the perceptual systems are at work' (1982[1976]: 397–8). Secondly, if perception is a mode of action, then what we perceive must be a direct function of how we act. Depending on the kind of activity in which we are engaged, we will be attuned to picking up particular kinds of information. The knowledge obtained through direct perception is thus *practical*, it is knowledge about what an environment offers for the pursuance of the action in which the perceiver is currently engaged. In other words, to perceive an object or event is to perceive what it *affords*. Perhaps the most fundamental contribution of Gibson's approach to perception lay in his insight that the information picked up by an agent in the context of practical activity specifies what are called the 'affordances' of objects and events in the environment (Gibson 1979: 127–43).

Thirdly, the information that is potentially available to an agent is inexhaustible: there is no limit to what can be perceived. Throughout life one can keep on seeing new things in an otherwise permanent world, not by constructing the same sense data according to novel conceptual schemata, but by a sensitisation or 'fine-tuning' of the perceptual system to new kinds of information. Novel perceptions arise from creative acts of discovery rather than imagining, and the information on which they are based is available to anyone attuned to pick it up. Finally, and following from the above, one learns to perceive in the manner appropriate to a culture, not by acquiring programmes or conceptual schemata for organising sensory data into higher-order representations, but by 'hands-on' training in everyday

tasks whose successful fulfilment requires a practised ability to notice and to respond fluently to salient aspects of the environment. In short, learning is not a transmission of information but – in Gibson's (1979: 254) words – an 'education of attention'. As such, it is inseparable from a person's life in the world, and indeed continues for as long as he or she lives.

There are clear parallels between the ecological critique, in the field of psychology, of cognitive science and the critique by practice theorists of cognitive anthropology, which I reviewed in the first part of this chapter. Both Gibson's ecological psychology and Bourdieu's theory of practice set out to re-embed perception and cognition within the practical contexts of people's ongoing engagement with their environments in the ordinary course of life. And both seek to escape from the sterile Cartesian dualisms of mind and nature, subject and object, intellection and sensation, and so on. Yet while the impact of Bourdieu's work in social and cultural anthropology has been immense, the relevance of Gibsonian ecological psychology to anthropological theory has been little explored. An obvious reason for the discrepancy lies in the fact that Gibson himself devoted scant attention to the specifically social and cultural dimensions of human life, preferring – if anything – to downplay the significance of the distinction between human beings and other animals. In developing his theory of affordances, Gibson did devote a brief section to 'other persons and animals' in the environment of the perceiver, noting that they have the peculiar capacity to 'act back' or, literally, to *interact* with the perceiver. Thus 'behavior affords behavior, and the whole subject matter of psychology and of the social sciences can be thought of as an elaboration of this basic fact' (Gibson 1979: 135). But beyond suggesting that the perception of mutual affordances in social life involves the same principles of information pickup as are involved in the perception of inanimate objects, Gibson did not pursue further the implications of this rather sweeping statement.

A recent attempt to develop this neglected aspect of the Gibsonian programme has been made by Edward Reed (1988a). The crux of his argument is that social agents can not only directly perceive their mutual affordances for one another, but also *share* their direct perception of other constituents of the environment. Attuned through prior training and experience to attending to similar invariants, and moving in the same environment in the pursuit of joint activities, they will pick up the same information (Reed 1988a: 119–20, see Gibson 1982[1967]: 412). Thus, contrary to the axioms of cognitive anthropology, the communion of experience that lies at the heart of sociality does not depend upon the organisation of sensory data, initially private to each perceiver, in terms of an objective system of collective representations. Rather, sociality is given from the start, *prior* to the objectification of experience in cultural categories, in the direct, perceptual involvement of fellow participants in a shared environment (Ingold 1993a: 222–3). This, indeed, is what makes anthropological fieldwork possible, for it allows the fieldworker and local people to inhabit a common ground of experience, even though each may bring to bear a radically different conceptual frame to the task of its interpretation. As Michael Jackson notes, 'by using one's body in the same way as others in the same environment one finds oneself informed by an understanding which may then be interpreted according to one's own custom or bent, yet which remains grounded in a field of practical activity and thereby remains consonant with the experience of those among whom one has lived' (1989: 135).

The environment of joint practical activity should not, however, be confused with the physical world of 'nature' (Gibson 1979: 8). For the world can appear in this latter guise only to a creature that can disengage itself – or imagine itself to be disengaged – from

the processes of its own material life. But the world we inhabit does not confront us, it surrounds us. This does not mean that it is any less real; the environment, however, is reality constituted in *relation* to the beings whose environment it is. As I have argued elsewhere (Ingold 1992a), Gibsonian psychology offers a way of thinking about human-environmental relations that dispenses with the conventional dichotomy between naturally given and culturally constructed worlds. According to convention, it is necessary to distinguish between the 'real' environment, as it is presented to detached, scientific observation, and the 'perceived' environment as it is built up through a selective response to stimuli (Brookfield 1969: 53). In anthropology, the distinction is commonly expressed by means of a contrast between the 'etic' level of objective description and the 'emic' level on which the environment is made meaningful by cultural subjects.[5] Yet from a Gibsonian perspective, it is apparent that the world becomes a meaningful place for people through being *lived in*, rather than through having been constructed along the lines of some formal design. Meanings are not attached by the mind to objects in the world, rather these objects take on their significance – or in Gibson's terms, they afford what they do – by virtue of their incorporation into a characteristic pattern of day-to-day activities. In short, far from being inscribed upon the bedrock of physical reality, meaning is immanent in the relational contexts of people's practical engagement with their lived-in environments.

PHENOMENOLOGY

It is at this point that ecological psychology makes contact with an older, Continental European tradition of philosophical inquiry, broadly characterised as phenomenological, and represented above all in the works of Martin Heidegger and Maurice Merleau-Ponty. Just as the point of departure, for Gibson, had been the perceiver-in-his/her-environment, so likewise these philosophers set out from the premise that every person is, before all else, a being-in-the-world. And their intellectual agenda, like that of Gibson, was fundamentally antagonistic to the kind of rationalism whose contemporary manifestation, in the field of psychology, is cognitive science. Yet in some ways they went even further. For all his emphasis on perception as a process that is continually going on, Gibson assumed that the world which the perceiver moves around in and explores is relatively fixed and permanent, somehow pre-prepared with all its affordances ready and waiting to be taken up by whatever creatures arrive to inhabit it.[6] From a phenomenological standpoint, by contrast, the world emerges with its properties alongside the emergence of the perceiver in person, against the background of involved activity. Since the person is a being-in-the-world, the coming-into-being of the person is part and parcel of the process of coming-into-being of the world.

Consider, for example, Heidegger's critique of Cartesianism (reviewed in Dreyfus 1991: 109–27). Heidegger begins by distinguishing two ways in which the world may 'show up' to a being who is active within it: availableness and occurrentness. The former is evident in our everyday use of the most familiar things around us, which, absorbed into the current of our activity (as indeed, we are ourselves), become in a sense transparent, wholly subordinate to the 'in-order-to' of the task at hand. The latter refers to the way in which things are revealed in their essential nature to an observer who self-consciously stands back from the action, assuming a stance of contemplative detachment or disinterested reflection. Now Cartesian ontology, which takes as its starting point the self-contained subject confronting a domain of isolable objects, assumes that things are initially encountered in their pure occurrentness, or brute facticity. The perceiver has first to make sense of these occurrent

entities – to render them intelligible – by categorising them, and assigning to them meanings or functions, before they can be made available for use. Heidegger, however, reverses this order of priority. For a being whose primary condition of existence is that of dwelling in the world, things are initially encountered in their availableness, as already integrated into a set of practices for 'coping' or getting by. To reveal their occurrent properties, things have to be rendered *un*intelligible by stripping away the significance they derive from contexts of ordinary use. This, of course, is the explicit project of natural science, which seeks to describe and explain a world which the rest of us are preoccupied with living in. Yet the scientist, like everyone else, is a being-in-the-world, and scientific practice, as any other skilled activity, draws unselfconsciously upon the available. Thus even science, however detached and theoretical it may be, takes place against a background of involved activity. The total disengagement of the subject from the world, from which Cartesianism charts a process of building up from the occurrent to the available, is therefore a pure fiction which can only be reached by extrapolating to the point of absurdity a progressive reduction from the available to the occurrent.

If, as Heidegger seems to suggest, self and world merge in the activity of dwelling, so that one cannot say where one ends and the other begins, it surely follows that the intentional presence of the perceiving agent, as a being-in-the-world, must also be an *embodied* presence. This was the principal contention of Merleau-Ponty in his massive treatise, dating from 1945 [trans. 1962], on the *Phenomenology of perception*. 'The body', Merleau-Ponty wrote, 'is the vehicle of being in the world, and having a body is, for a living creature, to be involved in a definite environment, to identify oneself with certain projects and be continually committed to them' (1962: 82). Like Heidegger, Merleau-Ponty was concerned to reverse the ontological priorities of Cartesian rationalism. Just as for Heidegger, the available is the ground upon which we may seek to reveal the properties of the occurrent, so for Merleau-Ponty our knowledge of the body as a physical thing – as a mere conduit or target of the mind's attention – is grounded in a more fundamental awareness, pre-objective and pre-conscious, which is given by the existential condition of our total bodily immersion, from the start, in an environment. Only because we are thus immersed in the world can we imagine ourselves as existing separately from it. The problem of perception lies in understanding the nature of this immediate pre-objective experience, itself a precondition for objective thought. Accordingly, Merleau-Ponty sought to uncover 'underneath the objective and detached knowledge of the body that other knowledge which we have of it by virtue of its always being with us and of the fact that *we are our body*' (1962: 206, my emphasis). In this latter sense, the body is neither object nor instrument, it is rather the *subject* of perception.

In recent years, albeit somewhat belatedly, many anthropologists have begun to read Merleau-Ponty with renewed interest. Though there is nothing particularly novel about anthropological concerns with the body and its symbolism, much work in this field is marked by a tendency to treat body praxis as a mere vehicle for the outward expression of meanings emanating from a higher source in culture or society. This is true, for example, of the writings of Mary Douglas. In line with her general thesis, reviewed in the first part of this chapter, of the cultural construction of experience, Douglas holds that the body is a medium whose forms – whether adopted in movement or repose – 'express social pressures in manifold ways' (1970: 93). As Jackson has eloquently shown, this 'subjugation of the bodily to the semantic' diminishes the body and its experience in two ways. First, body movements – postures and gestures – are reduced to the status of signs which direct the analyst in search of what they stand for, namely *extra*-somatic cultural meanings. Secondly,

the body is rendered passive and inert, while the active role of mobilising it, putting it to use and charging it with significance is delegated to a knowing subject which is both detached from the body and reified as 'society' (Jackson 1989: 122–3). The first reduction fails to recognise that gestures, whatever they might be held to symbolise, delineate their own meanings through their embeddedness in social and material contexts of action. The second reduction ignores a consideration pivotal to Merleau-Ponty's phenomenology: that the body is given in movement, and that bodily movement carries its own immanent intentionality. Indeed it is because of this intentionality that the subject's action is, at one and the same time, a movement of perception (1962: 110–11).[7]

Drawing inspiration from Merleau-Ponty, Jackson (1989) calls for studies that would take as their focus the 'body subject' in its dealings with the world. In similar vein, and linking Merleau-Ponty's concerns with perception to Bourdieu's with practice, Thomas Csordas (1990) puts the case for the establishment of a 'paradigm of embodiment' in anthropological inquiry. Far from treating the body as an *object* of study, this paradigm would be launched from the postulate that 'the body is to be considered as the *subject* of culture, or in other words as the existential [as opposed to the cognitive] ground of culture' (1990: 5). In its promise to collapse the Cartesian dualities between mind and body, subject and object, the paradigm holds a certain appeal for many anthropologists whose familiarity with indigenous, non-Western understandings – which are not generally concordant with such dualities – predisposes them to adopt a critical attitude towards the foundational assumptions of Western thought and science. Not everyone has been won over, however, as is evident from the continuing strength of cognitive anthropology, and from the pronouncements of anthropologists such as Bloch (1991), D'Andrade (1995) and Sperber (1996) who see a role for anthropology in an interdisciplinary alliance with cognitive science. Moreover, as I shall show by way of conclusion, there remain three major obstacles to the further development of the phenomenological approach.

CONCLUSION

The first obstacle has to do with the problematic status of biology. Even anthropologists who would readily accept the idea of embodiment as a paradigm for the study of culture, and who denounce the mind/body distinction, tend to balk at attempts to soften the conventional dichotomy between culture and biology (for example, Csordas 1990: 36). In effect, the dichotomy remains as strong as it always was; only the body has been repositioned. Formerly placed with the organism on the side of biology, the body has now reappeared as a 'subject' on the side of culture. Far from collapsing the Cartesian dualism of subject and object, this move actually serves to reproduce it. Moreover it leaves the organism bodiless, reduced to an inchoate mass of biological potential. The embodiment of culture, in short, leads to nothing less than the disembodiment of the organism! Indeed to posit some kind of biological residuum that exists prior to, and independently of, the culturally constituted body is to resort to the very objectivism that a phenomenological approach claims to repudiate (Morton 1995). It seems to me that to consolidate the theoretical gains brought by the paradigm of embodiment, one final step has yet to be taken: that is, to recognise that the body *is* the human organism, and that the process of embodiment is one and the same as the development of that organism in its environment.

This leads to the second obstacle, which is that the cause of dissolving the division between body and mind is ill-served by emphasising one term to the exclusion of the other. One could, in principle, speak just as well of enmindment as of embodiment, to

emphasise the way in which the body and its surroundings are incorporated into those processing loops that underwrite human powers of agency and intentionality. Body and mind, after all, are not two separate things but two ways of describing the same thing – or better, the same process – namely the environmentally situated activity of the human organism-person (see Chapter Nineteen, pp. 352–3). Mind, as Gregory Bateson always insisted, is not 'in the head' rather than 'out there in the world', but immanent in the active, perceptual engagement of organism and environment (Bateson 1973). Indeed the distance between a Merleau-Pontyan phenomenology of the body and what Bateson christened the 'ecology of mind' is not as great as might first appear.

Finally, even if it is agreed that a phenomenological approach offers a richer and more 'experience-near' (Geertz 1984: 124) account of human life in the world than do the more formal, 'experience-distant' concepts of cognitive science, the problem remains of translating this approach into a programme of research that would give us a more accurate idea than we presently have of how people routinely succeed, in their everyday, skilful 'coping', in performing with ease actions that are far beyond the capabilities of any machine yet devised. It is easy to pour scorn on the efforts of researchers in artificial intelligence to replicate the processes at work in the human brain, but as Dreyfus admits (1992: xliv), no one knows how the brain does it, nor are philosophers in any way equipped to provide the answers.

What we can say, however, is that the effect of taking the agent-in-an-environment rather than the isolated, self-contained individual as our point of departure is to collapse not only the venerable Durkheimian distinction between the individual and society, but also the division – which has traditionally rested on this distinction – between the two disciplines of anthropology and psychology. I can see no further intellectual justification for continuing to separate these disciplines. For we now recognise that such processes as thinking, perceiving, remembering and learning have to be studied within the ecological contexts of people's interrelations with their environments. We recognise, too, that the mind and its properties are not given in advance of the individual's entry into the social world, but are rather fashioned through a lifelong history of involvement in relationships with others. And we know that it is through the activities of the embodied mind (or enminded body) that social relationships are formed and reformed. Psychological and social processes are thus one and the same. And the discipline that will be called into being to study these processes, whatever we choose to call it, will be the study of how people perceive, act, think, know, learn and remember within the settings of their mutual, practical involvement in the lived-in world.

Building, dwelling, living:

How animals and people make themselves at home in the world

This chapter is partly autobiographical, and describes my own attempts over the last few years to find a satisfactory way of understanding the relationships between people and their environments. It is incomplete, in the sense that I cannot claim to have yet found, or that I will ever find, final answers to the questions that are bothering me. Indeed, if one of the main conclusions of what I have to say is that so-called 'ends' or 'goals' are but landmarks on a journey, then this must apply as much to my own thinking and writing as to everything else that people do in the world. The most fundamental thing about life is that it does not begin here or end there, but is always *going on*. And for the same reason, as we saw in Chapter One (p. 20), environments are never complete but are continually under construction. My purpose here is to consider the implications of this point with regard to our ideas about the similarities and contrasts between human beings and other animals in the ways in which they go about creating environments for themselves. I am concerned, in particular, with the meaning of architecture, or of that part of the environment which is conventionally described as 'built'.

In recent years, my own ideas have undergone something of a sea change, which is where the autobiographical element comes in. I began with a view that was – and indeed still is – fairly conventional in anthropology, one that sets out from the premise that human beings inhabit discursive worlds of culturally constructed significance, laid out upon the substrate of a continuous and undifferentiated physical terrain. If I differed from my colleagues, at least in social anthropology, it was in my concern to spell out the implications of this premise for the distinction between human beings and non-human animals. I felt sure that the models developed by ecologists and evolutionary biologists to account for the relations between organisms and their environments must apply as well to the human as to any other species, yet it was also clear to me that these models left no space for what seemed to be the most outstanding characteristic of human activity – that it is intentionally motivated. Human intentions, I argued, are constituted in the intersubjective domain, of relationships among *persons*, as distinct from the domain in which human beings, as biological *organisms*, relate to other components of the natural environment. Human life, I therefore proposed, is conducted simultaneously in two domains – a social domain of interpersonal relations and an ecological domain of inter-organismic relations – so that the problem is to understand the interplay between them (Ingold 1986a: 9).

Starting out from two quite reasonable propositions – that human beings are organisms, and that human action is intentionally motivated – I thus ended up with what appeared to be a thoroughly *unreasonable* result: that unlike all other animals, humans live a split-level existence, half in nature, half out; half organism, half person; half body, half mind. I had come out as an unreconstructed Cartesian dualist, which is perhaps not

so surprising when you remember that the intellectual division of labour between the natural sciences and the humanities – and within anthropology between its biological and sociocultural divisions – rests on a Cartesian foundation. Something, I felt, must be wrong somewhere, if the only way to understand our own creative involvement in the world is by taking ourselves out of it. Eventually, it dawned on me that although the problem was an anthropological one, it would require more than an anthropological solution: what is needed is a completely new way of thinking about organisms and about their relations with their environments; in short, a new ecology. And it is towards this new ecology that I have been groping.

In this task, I have gained inspiration from three principal sources. The first comes from biology, and consists in the work of the handful of courageous scholars – principally developmental biologists – who have been prepared to challenge the hegemony of neo-Darwinian thinking in the discipline (e.g. Ho and Saunders 1984, see also Oyama 1985). The second lies in what is known as 'ecological psychology', an approach to understanding perception and action that is radically opposed to the cognitivist orientation of the psychological mainstream (Gibson 1979, Michaels and Carello 1981). And the third comes from philosophical writing of a broadly phenomenological bent, above all the works of Martin Heidegger (1971) and Maurice Merleau-Ponty (1962).[1] Although developed independently, in the different disciplinary contexts of biology, psychology and philosophy, these three approaches have much in common. Though I cannot now explore the commonalities in detail, I want to highlight just two of them that are rather central to what I shall have to say. First, all three approaches reverse the normal order of priority – normal, that is, in the history of Western thought – of form over process. Life, in this perspective, is not the revelation of pre-existent form but the very process wherein form is generated and held in place. Secondly, the three approaches adopt as their common point of departure the agent-in-its-environment, or what phenomenology calls 'being in the world', as opposed to the self-contained individual confronting a world 'out there'. In short, they maintain that it is through being inhabited, rather than through its assimilation to a formal design specification, that the world becomes a meaningful environment for people.

In what follows, I refer to this position as the 'dwelling perspective', by contrast to the more conventional position from which I began, and which I shall call the 'building perspective'. Thus the movement in my own thinking has been from the building perspective to the dwelling perspective. To document this movement, I shall start by spelling out the first of these perspectives, and its implications for the way we understand the construction of the built environment, in greater depth. I shall then explain what is entailed in adopting a dwelling perspective in its place. Finally, I shall consider how this shift from a building perspective to a dwelling perspective bears upon the concept and meaning of architecture.

CONSTRUCTING ENVIRONMENTS AND MAKING WORLDS

Our initial problem may be framed by juxtaposing two statements, the first of which will be familiar to anthropological readers, the second much less so. 'Man', Clifford Geertz has declared, 'is an animal suspended in webs of significance he himself has spun' (1973: 5). One is led to suppose that non-human animals are not so suspended. Spiders spin webs, and do indeed suspend themselves in them, but their webs are tangible objects – they catch flies, not thoughts. But now consider this passage from the delightful but little
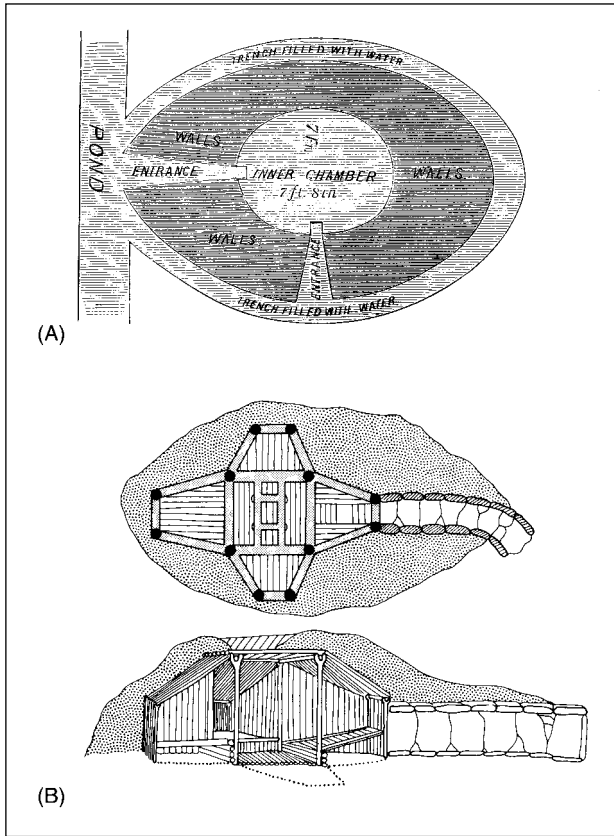
Figure 10.1 Human and animal architecture. (A) Ground plan of beaver lodge (from Morgan 1868: 142); (B) Floor plan and cross-section of Eskimo house, Mackenzie region (from Mauss and Beuchat 1979: 4).

known text of Jakob von Uexküll, *A Stroll through the Worlds of Animals and Men*: 'As the spider spins its threads, every subject spins his relations to certain characters of the things around him, and weaves them into a firm web which carries his existence' (1957: 14). Now the subjects of which von Uexküll speaks are not merely human, nor even close to human. Indeed he begins his stroll with a particular species of parasitic tick! If, as it would seem, what Geertz says of humankind applies equally to ticks, then what – if anything – *does* distinguish human from non-human environments?

Though it might be said, with Nelson Goodman (1978), that human beings are makers of worlds, this only begs the question of how human acts of world-making differ from the processes whereby non-human animals fashion their environments. It was this question that initially led me to focus on the meaning of the built environment: not, that is, on what a built environment means, but on what it means to say that an environment is built. How can we distinguish an environment that is built from one that is not? It is all very well to define the built environment, as do Denise Lawrence and Setha Low in a recent review, to include 'any physical alteration of the natural environment, from hearths to cities, through construction by humans' (1990: 454). But why should the products of human building activity be any different, in principle, from the constructions of other animals? Or to phrase the same question in another way, by what right do we conventionally identify the artificial with the 'man-made'? And where, in an environment that bears the imprint of human activity, can we draw the line between what is, and is not, a house, or a building, or an instance of architecture (Pearson and Richards 1994: 2)?

My first efforts to deal with these questions all hinged on a crucial distinction, which I thought quite unproblematic at the time, between design and execution. The argument ran roughly as follows: imagine a mollusc shell, a beaver's lodge and a human house. All have been regarded, at one time or another, as instances of architecture. Some authors would restrict architecture to the house, others would include the lodge – as an example of 'animal architecture' (von Frisch 1975) – but exclude the shell, others would include all three forms. The usual argument for excluding the shell is that it is attached to the body of the mollusc, whereas for something to count as an artefact it must be detached

from the body. The shell, it is said, 'just grows' – there is nothing the mollusc can or need do about it. The beaver, by contrast, works hard to put its lodge together: the lodge is a product of the beaver's 'beavering', of its activity. Likewise the house is a product of the activities of its human builders. In their respective forms, and levels of complexity, they need not be that different (Figure 10.1). Should we, then, conclude that the lodge is beaver-made just as much as the house is man-made?

To this question I answered in the negative (Ingold 1986b: 345–6; 1988b: 90). Wherever they are, beavers construct the same kinds of lodges and, so far as we know, have always done so. Human beings, by contrast, build houses of very diverse kinds, and although certain house forms have persisted for long periods, there is unequivocal evidence that these forms have also undergone significant historical change. The difference between the lodge and the house lies, I argued, not in the construction of the thing itself, but in the origination of the *design* that governs the construction process. The design of the lodge is incorporated into the same programme that underwrites the development of the beaver's own body: thus the beaver is no more the designer of the lodge than is the mollusc the designer of its shell. It is merely the *executor* of a design that has evolved, along with the morphology and behaviour of the beaver, through a process of variation under natural selection. In other words, both the beaver – in its outward, phenotypic form – and the lodge are 'expressions' of the same underlying genotype. Richard Dawkins (1982) has coined the term 'extended phenotype' to refer to genetic effects that are situated beyond the body of the organism, and in this sense, the lodge is part of the extended phenotype for the beaver.

Human beings, on the other hand, are the authors of their own designs, constructed through a self-conscious decision process – an intentional selection of ideas. As Joseph Rykwert has put it: 'unlike even the most elaborate animal construction, human building involves decision and choice, always and inevitably; it therefore involves a project' (1991: 56). It is to this project, I maintained, that we refer when we say that the house is *made*, rather than merely constructed. I even went so far as to extend the argument to the domain of toolmaking, criticising students of animal behaviour for their assumption that wherever objects are manifestly being modified or constructed for future use, tools are being made. They are only being made, I claimed, when they are constructed in the imagination prior to their realisation in the material (Ingold 1986a: 40–78). But if the essence of making lies in the self-conscious authorship of design, that is in the construction of a project, it follows that things can be made without undergoing any actual physical alteration at all. Suppose that you need to knock in a nail but lack a hammer. Looking around the objects in your environment, you deliberately select something best suited to your purpose: it must be hard, have a flat striking surface, fit in the hand, and so on. So you pick up an appropriate stone. In this very selection, the stone has 'become' a hammer in that, in your mind's eye, a 'hammer-quality' has been attached to it. Without altering the stone in any way, you have made a hammer out of it.[2] In just the same manner, a cave may come to serve as a dwelling, a stretch of bare flat land as an airstrip, or a sheltered bay as a harbour.

To deal with situations of this kind, I chose the term *co-option*. Thus the stone was co-opted, rather than constructed, to become a hammer. It follows that there are two kinds of making: co-optive and constructive. In co-optive making an already existing object is fitted to a conceptual image of an intended future use, in the mind of a user. In constructive making this procedure is reversed, in that the object is physically remodelled to conform more closely to the pre-existing image. Indeed it seemed that the history of

things – of artefacts, architecture and landscapes – could be understood in terms of successive, alternating steps of co-option and construction. We press into service what we find around us to suit our current purposes, we proceed to modify those things to our own design so that they better serve these purposes, but at the same time our objectives – or adaptive requirements – also change so that the modified objects are subsequently co-opted to quite other projects for which they are perceived to come in handy, and so on and on. Exactly the same model has been applied to account for the evolution of organisms – Darwin himself used it in his book on orchids (1862: 348).[3] To adopt terms suggested by Stephen J. Gould and Elisabeth Vrba (1982), structures *ad*apted for one purpose may be *ex*apted for another, subsequently undergoing further adaptation, only to be exapted for yet another purpose ... The difference is just that in the case of organic evolution, the selection involved is natural rather than intentional (Ingold 1986b: 200–2).

It was in searching around for ways to express these ideas that I came across the writings of Jakob von Uexküll, Estonian-born aristocrat and a founding figure in the fields of both ethology and semiotics, to whose *Stroll through the Worlds of Animals and Men*, first published in 1934, I have already referred. Reacting against the mechanistic biology of the day, von Uexküll argued that to treat the animal as a mere assemblage of sensory and motor organs is to leave out the subject who uses these organs as tools, respectively, of perception and action:

> We who still hold that our sense organs serve our perceptions, and our motor organs our actions, see in animals ... not only the mechanical structure, but also the operator, who is built into their organs, as we are into our bodies. We can no longer regard animals as mere machines, but as subjects whose essential activity consists in perceiving and acting ... All that a subject perceives becomes his *perceptual world* and all that he does, his *effector world*. Perceptual and effector worlds together form a closed unit, the *Umwelt*.
>
> (1957: 6)

For von Uexküll, the *Umwelt* – that is, the world as constituted within the specific life activity of an animal – was to be clearly distinguished from the environment, by which he meant the surroundings of the animal as these appear to the indifferent human observer. We human beings cannot enter directly into the *Umwelten* of other creatures, but through close study we may be able to imagine what they are like. But the reverse does not hold: the non-human animal, because it cannot detach its consciousness from its own life-activity, because it is always submerged within its own *Umwelt*, cannot see objects as such, for what they are in themselves. Thus for the animal, the environment – conceived as a domain of 'neutral objects' – cannot exist (Ingold 1992a: 43).

Towards the end of his stroll, von Uexküll invites his readers to imagine the manifold inhabitants of an oak tree. There is the fox, who has built its lair between the roots; the owl, who perches in the crotch of its mighty limbs; the squirrel, for whom it provides a veritable maze of ladders and springboards; the ant, who forages in the furrows and crags of its bark; the wood-boring beetle who feeds and lays its eggs in passages beneath the bark, and hundreds of others (Figures 10.2 and 10.3). Each creature, through the sheer fact of its presence, confers on the tree – or on some portion of it – a particular quality or 'functional tone': shelter and protection for the fox, support for the owl, a thorough-fare for the squirrel, hunting grounds for the ant, egg-laying facilities for the beetle. The same tree, thus, figures quite differently within the respective *Umwelten* of its diverse

inhabitants. But for none of them does it exist *as a tree* (von Uexküll 1957: 76–9). Now consider the forester, who is measuring up the tree to estimate the volume of timber it will yield. For him, the tree figures as a potential source of valuable raw material, whereas for the little child – again to follow von Uexküll's example (pp. 73–5) – it seems to be alive and to reveal a frightening aspect. But these different perceptions are not tied, as they are for non-human animals, to the *modus operandi* of the organism. Human beings do not construct the world in a certain way by virtue of what they are, but by virtue of their own conceptions of the possibilities of being. And these possibilities are limited only by the power of the imagination.

Herein, it seemed to me, lay the essential distinction I was seeking between the respective ways in which the subjective existence of human and non-human animals is suspended in 'webs of significance'. For the non-human, every thread in the web is a relation between it and some object or feature of the environment, a relation that is set up through its own practical immersion in the world and the bodily orientations that this entails. For the human, by contrast, the web – and the relations of which it consists – are inscribed in a separate plane of mental representations, forming a tapestry of meaning that *covers*

Figure 10.2 Fox, owl and oak tree

From Jakob von Uexküll 'A Stroll through the Worlds of Animals and Men,' in *Instinctive Behavior*, 1957, pp. 76–7, illustrations by G. Kriszat.

over the world of environmental objects. Whereas the non-human animal perceives these objects as immediately available for use, to human beings they appear initially as occurrent phenomena to which potential uses must be *affixed*, prior to any attempt at engagement. The fox discovers shelter in the roots of a tree, but the forester sees timber only in his mind's eye, and has first to fit that image in thought to his perception of the occurrent object – the tree – before taking action. Or to take another example, suggested recently by Maurice Bloch, the 'swidden plot' exists as an image in the mind of the horticulturalist, who has to match that image to an observed stand of uncut forest prior to transforming it into a field (Bloch 1991: 187). As mental representations, the timber and the swidden plot belong to the 'intentional worlds' (cf. Shweder 1990: 2) of the forester and the farmer; as occurrent phenomena, the oak tree and the stand of forest belong to the physical environment of 'neutral objects'. It has been conventional, in anthropological and other writings of Western academic provenance, to refer to these worlds, of human values and purposes on the one hand, and of physical objects on the other, by means of the shorthand terms, culture and nature, respectively. And in a paper written

Figure 10.3 Ant, bark-boring beetle and oak tree

From Jakob von Uexküll 'A Stroll through the Worlds of Animals and Men,' in *Instinctive Behavior*, 1957, pp. 78–9, illustrations by G. Kriszat.

in 1987, I concluded that 'making is equivalent to the cultural ordering of nature – the inscription of ideal design upon the material world of things' (Ingold 1989: 506). This statement, I confess, is now a source of considerable embarrassment.

THE BUILDING PERSPECTIVE

In my defence, I can only say that I was singing a tune that has been sung by most anthropologists, in one form or another, for decades, in the context of an encounter with students of animal behaviour whose theories had no place for agency or intentionality at all, except as an epiphenomenal effect of innate predisposition.[4] This tune is what I earlier called the 'building perspective', and I should now like to elaborate on this perspective with reference to anthropological work other than my own. For a founding statement, we could turn once again to Geertz, and to his assertion that culture – or at least that kind of culture taken to be the hallmark of humanity – consists in 'the imposition of an arbitrary framework of symbolic meaning upon reality' (1964: 39). Reality, that which is imposed upon, is envisioned here as an external world of nature, a source of raw materials and sensations for diverse projects of cultural construction. Following from this, a distinction is commonly made between the *real* environment that is given independently of the senses, and the *perceived* environment as it is reconstructed in the mind through the ordering of sense data in terms of acquired, cognitive schemata. Other conventional oppositions that encode the same distinction, and that we have already encountered (see Chapter Three, p. 41, and Chapter Nine, p. 168), are between 'etic' and 'emic', and between 'operational' and 'cognised'. The starting point in all such accounts is an imagined *separation* between the perceiver and the world, such that the perceiver has to reconstruct the world, in the mind, prior to any meaningful engagement with it.
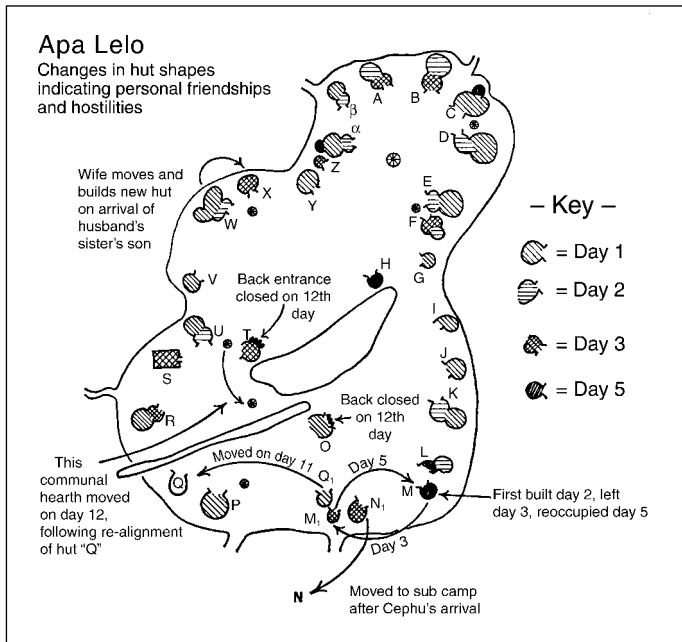
Figure 10.4 The Mbuti Pygmy camp of Apa Lelo

From C. M. Turnbull, *Wayward servants*, published by Eyre & Spottiswoode, 1965, p. 357.

Here, then, is the essence of the building perspective: that worlds are made before they are lived in; or in other words, that acts of dwelling are preceded by acts of worldmaking. A good example of this approach comes from the introduction to Maurice Godelier's book, *The mental and the material* (1986). Here, Godelier is concerned with the proper translation of the Marxian concepts *Grundlage* and *Überbau*, usually rendered in English as 'infrastructure' and 'superstructure'. He likens the *Überbau* to a building: 'The *Überbau* is a construction, an edifice which rises on foundations, *Grundlage*; and it [the *Überbau*] is the house we live in, not the foundations' (pp. 6–7). Human beings, then, inhabit the various houses of culture, pre-erected upon the universal ground of nature – including the universals of *human* nature. For another example, I would like to turn to Peter Wilson's *The domestication of the human species* (1988). In this book, Wilson argues that the most significant turning point in human social evolution came at the moment when people began to live in houses. Roughly speaking, this marks a division between hunters and gatherers, on the one hand, and agriculturalists and urban dwellers, on the other. 'Hunter-gatherers', Wilson writes, 'create for themselves only the flimsiest architectural context, and only the faintest line divides their living space from nature'. All other societies, by contrast, 'live in an architecturally modified environment', inhabiting houses and villages of a relatively enduring kind, structures that – even when abandoned – leave an almost indelible impression in the landscape. In essence, Wilson is distinguishing between societies with architecture and societies without it.

This is a bold generalisation, and like all such, it is an easy target for empirical refutation. That is not my concern, however. I am rather concerned to expose the assumptions entailed in making the distinction between an 'architecturally modified environment' and what is
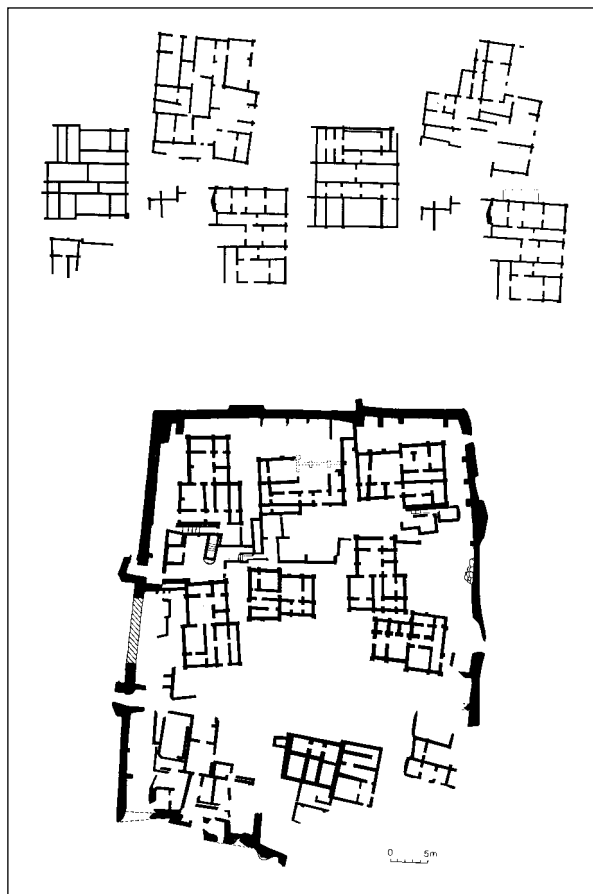
Figure 10.5 Building plans of three periods from the ancient Mesopotamian site of Tell es-Sawwan.

From J. Mellaart, *The Neolithic of the Near East*, published by Thames and Hudson, London 1975.

simply called 'nature'. For it is on this distinction that Wilson's entire argument rests. One objection to it immediately comes to mind. To be sure, the physical arrangement and formal properties of a hunter-gatherer encampment may be very different from those of a permanent village settlement. By way of example, compare the plan, shown in Figure 10.4, of the Mbuti Pygmy camp of Apa Lelo, in the Ituri forest of Zaire, with the plans shown in Figure 10.5 of the ancient Mesopotamian village site of Tell es-Sawwan. In the first case the spatial structure of settlement is loose, informal, and sensitive to the changing state of interpersonal relations between cliques, hosts and visitors. In the second it is tightly packed, geometrically regular, and appears to impose fairly tight constraints on the disposition of people and activities. Moreover, compared with the substantial buildings of the village settlement, the constructions of the hunter-gatherers are scarcely more that shades and windbreaks. Most of life, for hunter-gatherers, goes on around dwellings rather than in them. Nevertheless, the fact remains that hunter-gatherers do build shelters of various kinds. So who are we to say that they have no architecture? And if they do not, how are we to comprehend their building activity?

The answer that emerges from Wilson's account is that among hunter-gatherers, erecting shelters is one of a suite of activities, along with food-collecting, cooking, toolmaking and repair, childminding, and so on, that constitute the daily round for these people. Thus building activity is part and parcel of life in an environment that is already *given* in nature, and that has not itself been artificially engineered. With village architecture, by contrast, nature has to a degree been covered over or transformed, so that what immediately confronts people is not a natural environment but – in Wilson's words – 'an environment of their own making, the cultural' (1988: 8). If hunter-gatherers build as part of their adaptation to the given conditions of the natural environment, villagers adapt to the conditions of an environment that is already built. Either way, the environment is given in advance, as a kind of container for life to occupy. Where, as among hunter-gatherers, building is a part of everyday life, it is not supposed to have any lasting impact on the environment; where, as among villagers, the environment has been manifestly built, the buildings are apparently made before life begins in them. This, of course, is the architect's perspective: first plan and build the houses, then import the people to occupy them.

What, then, of the dwellings of nomadic pastoralists? A recent study comparing pastoral tent dwellings and village houses in Turkey and Iran by the archaeologist, Roger Cribb (1991), found that despite differences in the building materials used and the flexibility they afford, the tent and the house were virtually identical in their underlying organisational templates. What really distinguished the house from the tent was the degree to which the imposed, cultural design – shared by villagers and nomads alike – is actually translated into enduring, material structures. For such structures do not get built overnight; they grow cumulatively in the course of a settlement's continuous occupation, such that 'each new alteration or addition builds on a series of existing structures'. But in the case of a pastoral nomadic camp, 'each occupation is a fresh event', so that the camp 'has no such history but remains permanently retarded in the initial stages of the normal developmental cycle [of the settlement]' (1991: 156). Thus, although pastoralists carry a basic organisational template with them, there is little opportunity for its enduring physical realisation before the camp picks up and moves off somewhere else, where the occupation process starts all over again. In such cases, building never proceeds beyond the first phase of temporary habitation (Ingold 1992c: 795–6).

In a statement that epitomises the building perspective, Amos Rapoport writes that 'the organisation of space cognitively precedes its material expression; settings and built environments are thought before they are built' (1994: 488). In the case of villagers, the environment is ready-built. In the case of nomadic pastoralists, it would seem, the environment, though thought, is never more than partially built. As for the hunter-gatherers, it appears that the building hardly gets started at all: indeed Rapoport refers to the camp sites of Aboriginal people of the Australian Central Desert as exemplars of the situation where the environment is thought but *never* built. On these grounds, as we saw in Chapter Three (pp. 56–7), they are supposed to inhabit a 'natural' rather than an 'artificial' environment.

THE SEARCH FOR ORIGINS

Having spelled out the essence of the building perspective, let me now return to my earlier observation, comparing the forms of the beaver's lodge and the human house, that the first is tied, as it were, to the nature of the beaver itself, whereas the second is both historically and regionally variable. Among non-human animals, it is widely supposed, there can be no significant change in built form that is not bound to evolutionary changes in the essential form of the species. With human beings, by contrast, built form is free to vary independently of biological constraint, and to follow developmental pathways of its own, effectively decoupled from the process of evolution. In his famous paper of 1917, on 'The Superorganic', Alfred Kroeber declared: 'Who would be so rash as to affirm that ten thousand generations of example would convert the beaver from what he is into a carpenter or a bricklayer – or, allowing for his physical deficiency in the lack of hands, into a planning engineer!' (1952: 31). Yet human beings, through practice, example and a good measure of ingenuity, coupled with their ability to transmit their acquired know-how across the generations and to preserve it in long-term memory, have learned all these trades, and many more besides.

However, this argument implies some kind of threshold in the evolution of our own kind, at which point our ancestors were sufficiently endowed with the qualities of intelligence and manual dexterity to become the authors of their own projects of building. Taking off from this point, the history of architecture must be supposed to have proceeded

from the earliest dwellings to the modern construction industry, the species-specific nature of the human organism remaining all the while unchanged. But what *was* the earliest dwelling? According to Kenneth Bock, an event in the history of architecture – such as the construction of a Gothic vault – differs from an event in the evolution of species 'in that the former involves formation of intent or purpose on the part of an actor while the latter does not' (1980: 182). The same idea is implied by Joseph Rykwert when he suggests that the essence of architecture lies in 'taking thought about building' (1991: 54). But how did it come about that, at some decisive moment, our ancestors began to think about what they built?

As Rykwert shows, in his study of the notion of the 'primitive hut' in the history of architecture, this is a question that has long exercised the minds of Western thinkers. And the title of his book, *On Adam's House in Paradise* (1972), nicely conveys the mythic quality of the many speculative answers that have been proposed. Reproduced in Figure 10.6 is one of the more delightful images of 'the first hut', taken from the work of the great French architectural theorist, Eugène Viollet-le-Duc, *Histoire de l'habitation humaine*, published in 1875 (Viollet-le-Duc 1990: 26). Architecture began, for Viollet-le-Duc, when the problem of the need for shelter was met through the procedures of rational planning. In his tale of the building of the first hut the secret is revealed to a hapless primitive tribe, the Nairitti, by a progressive time-traveller by the name of Epergos, bestowed upon them as a gift of his superior intelligence. For Viollet-le-Duc, as for many others, Rykwert notes, it was 'the difference of conception, the attachment of meaning to his task, that distinguishes man's first attempts [at building] from those of the instinctually driven beasts' (1972: 22). These attempts may have been decidedly inferior to the constructions of animals, nevertheless they marked the turning point at which humanity was set upon the road to culture and civilisation.

The search for the first building continues to this day, though it is informed by a much better knowledge both of the archaeological traces left by early human or hominid populations, and of the behaviour of those species of animals – namely the great apes – most closely related to humankind. One of the most peculiar and distinctive aspects of the behaviour of chimpanzees, gorillas and orang-utans is their habit of building so-called 'nests'. In functional terms, they are not really nests at all: every individual animal builds its own nest afresh, each evening, and uses it for the sole purpose of sleeping. Nor does the nest site mark any kind of fixed point in the animal's movements; it may be built anywhere, and is abandoned the next morning (Groves and Sabater Pi 1985: 23). Nevertheless, assuming that the common ancestor of apes and humans would have had a similar habit, attempts have been made to trace an evolutionary continuum from this nesting behaviour to the residential arrangements of prototypical human groups (of which the camps of contemporary hunter-gatherers have frequently been taken as the closest exemplars, on the grounds of the presumed similarity of ecological context).

Comparing the nesting patterns of apes with the camping patterns of human hunter-gatherers, Colin Groves and J. Sabater Pi note some striking differences. The human 'nest', if we may call it that, is a fixed point for the movements of its several occupants, and a place to which they regularly return. In other words, it has the attributes of what the ethologist, Heini Hediger, would call 'home': it is a 'goal of flight' and a 'place of maximal security' (Hediger 1977: 181). There is a difference, too, in the respective ways in which apes and humans go about building their accommodation. For one thing, apes use material that comes immediately to hand, normally by a skilful interweaving of growing vegetation to form an oval-shaped, concave bed; whereas humans collect suitable materials from
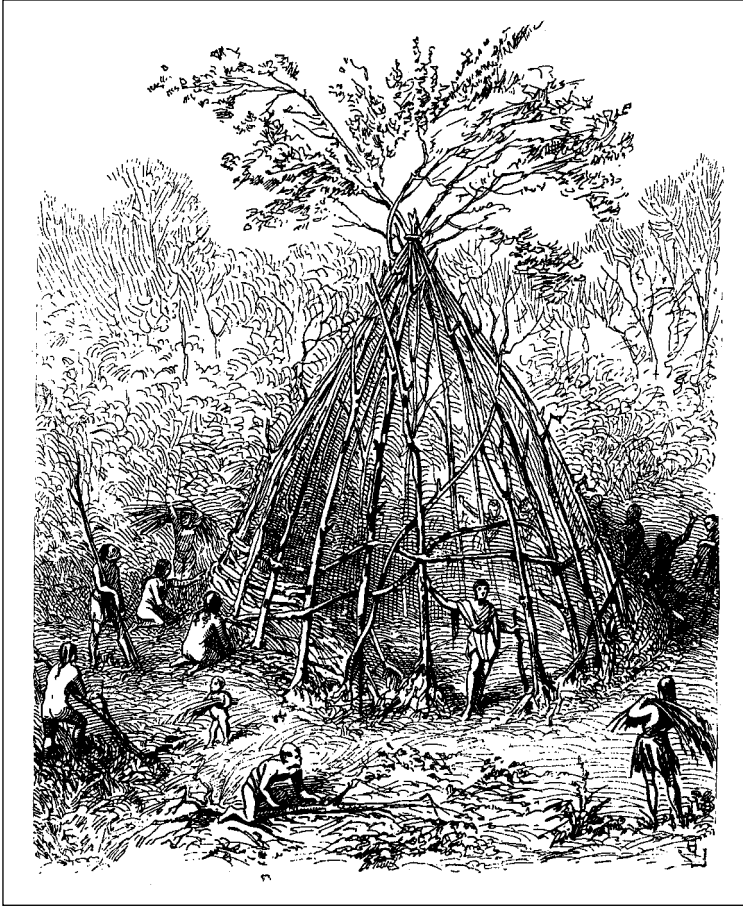
Figure 10.6 The first hut, as depicted by Viollet-le-Duc.

From *The architectural theory of Viollet-le-Duc: readings and commentary*, edited by M. F. Hearn, published by MIT Press, 1990, p. 26.

a distance, prior to their assembly into a convex, self-supporting structure. For another thing, the ape makes its nest by bending the vegetation around its own body; whereas the human builds a hut, and then enters it (Groves and Sabater Pi 1985: 45). There is a sense, as Hediger remarks, in which apes build from the 'bottom up', seeking support for rest and sleeping, whereas humans build from the 'top down' seeking shelter from sun, rain or wind (1977: 184). Yet there are also remarkable similarities between ape and human living arrangements, in the overall number and layout of nests or huts and in the underlying social organisation, and on the grounds of these similarities, Groves and Sabater Pi feel justified in arguing that human campsites are but elaborations of a generalised ape pattern. All the critical differences – the functioning of the site as a home-base, the collection of material prior to construction, the technique of building from the outside – can be put down, they think, to one factor, namely the human ability 'to visualise objects in new configurations, and to bring these configurations into being on the basis of that mental picture' (1985: 45).

Figure 10.7 The 'stone circle' from Bed I of Olduvai Gorge.

From M. D. Leakey, *Olduvai Gorge* (volume three), published by Cambridge University Press, 1971.

Though in substance based on fact rather than fantasy, the form in which this argument is cast is virtually identical to that of Viollet-le-Duc's tale of the building of the first hut. Equipped, albeit by natural selection rather than providential intervention, with foresight and intelligence, the first builders set to work to execute a plan that was already formed as a picture in their imagination. They had solved the problem of shelter in their minds, prior to putting the solution into practical effect. It is in this light that we can understand the extraordinary significance that has been attached to the so-called 'stone circle' discovered at the famous site of Olduvai Gorge in Tanzania, and dated to some 1.75 million years ago (Figure 10.7). In her interpretation of the circle, Mary Leakey writes that in its general appearance, it 'resembles temporary structures often made by present-day nomadic peoples who build a low stone wall round their dwellings to serve either as a windbreak or as a base to support upright branches which are bent over and covered with either skins or grass' (1971: 24). A photograph of such a dwelling, from the Okombambi people of Southwest Africa, is provided to substantiate the comparison. As always in these matters, the specific interpretation has been challenged. What has not been challenged, however, is the frame of mind that leads us to suppose that if the interpretation were correct, we would have at last discovered the *real* 'first hut', and with it not just the origins of architecture, but the point of transition to true humanity.

For it is the structure of our thought, not the patterning of the archaeological record, that sets up a point of origin at the intersection of two axes, one of evolutionary change – leading from ancestral pongids and hominids to human beings, the other of historical change – leading from Palaeolithic hunting and gathering to modern industry. (Why this should be so is a matter to which I return in Chapter Twenty-one, pp. 388–90.) To explode the myth of the first hut thus requires nothing less than the dissolution of the dichotomy, which in modern scholarship separates the biological sciences from the humanities, between evolution and history, or between the temporal processes of nature and culture. Before indicating how this might be done, I need to introduce what I have called the 'dwelling perspective'.

THE DWELLING PERSPECTIVE

For this purpose I turn to Martin Heidegger's evocative essay, 'Building Dwelling Thinking', on which I have drawn for my title (Heidegger 1971: 145–61). In this essay, Heidegger asks what it means to build and to dwell, and what the relation is between these two – between building and dwelling. He begins with what might be taken as the hegemonic view, as enshrined in the discourse of Western modernity. This is that building and dwelling are separable but complementary activities, related as means to ends. We build houses so that we may dwell in them (or, as is usual in industrial society, some people build houses for other people to live in). To dwell, in this sense, means merely 'to occupy a house, a dwelling place'. The building is a *container* for life activities, or more strictly for certain life activities, since there are other kinds of activity that go on outside houses, or in the open air. Yet, Heidegger asks, 'do the houses in themselves hold any guarantee that *dwelling* occurs in them?' (1971: 146). To clarify matters, let us call the physical structure, the building in itself, the *house*; and the setting within which people dwell the *home* (Lawrence 1987). Heidegger's question can then be rephrased as follows: what does it take for a house to be a home (Pearson and Richards 1994: 6)? Merely to pose the question in this form suggests that there must be more to dwelling than the mere fact of occupation. What, then, does it mean, 'to dwell'?

Heidegger tackles the issue through an exercise in etymology. The current German word for the verb 'to build', *bauen*, comes from the Old English and High German *buan*, meaning 'to dwell'. Though this original meaning has been lost, it is preserved in such compounds as the English 'neighbour', meaning one who dwells nearby. Moreover, this sense of dwelling was not limited to one sphere of activity among many – to domestic life, say, as opposed to work or travel. Rather it encompassed the whole manner in which one lives one's life on the earth; thus 'I dwell, you dwell' is identical to 'I am, you are'. Yet *bauen* has another sense: to preserve, to care for, or more specifically to cultivate or to till the soil. And then there is the third sense: to construct, to make something, to raise up an edifice. Both these modern senses of building – as cultivation and as construction – are thus shown to be encompassed within the more fundamental sense of dwelling. In the course of time, however, this underlying sense has fallen into disuse, such that *bauen* has come to be reserved exclusively for cultivation and construction. Having forgotten how the latter activities are grounded in dwelling, modern thought then *rediscovers* dwelling as the occupation of a world already built.

In short, where before, building was circumscribed within dwelling, the position now appears reversed, with dwelling circumscribed within building. Heidegger's concern is to regain that original perspective, so that we can once again understand how the activities of building – of cultivation and construction – belong to our dwelling in the world, to the

way we are. 'We do not dwell because we have built, but we build and have built because we dwell, that is because we are dwellers . . . To build is in itself already to dwell . . . *Only if we are capable of dwelling, only then can we build*' (Heidegger 1971: 148, 146, 160, original emphases). I take this to be the founding statement of the dwelling perspective.[5] What it means is that the forms people build, whether in the imagination or on the ground, arise within the current of their involved activity, in the specific relational contexts of their practical engagement with their surroundings. Building, then, cannot be understood as a simple process of transcription, of a pre-existing design of the final product onto a raw material substrate. It is true that human beings – perhaps uniquely among animals – have the capacity to envision forms in advance of their implementation, but this envisioning is itself an activity carried on by real people in a real-world environment, rather than by a disembodied intellect moving in a subjective space in which are represented the problems it seeks to solve (see Chapter Twenty-three, pp. 418–19). In short, people do not import their ideas, plans or mental representations into the world, since that very world, to borrow a phrase from Merleau-Ponty (1962: 24), is the homeland of their thoughts. Only because they already dwell therein can they think the thoughts they do.

To argue that the forms of buildings arise as a kind of crystallisation of human activity within an environment clearly puts paid to my initial dichotomy between design and execution. No longer can we assume, with Christopher Alexander, that form is 'the ultimate object of design' (1964: 15), as though the one issued quite automatically and unproblematically from the other. To the contrary, a dwelling perspective ascribes the generation of form to those very processes whose creativity is denied by that perspective which sees in every form the concrete realisation of an intellectual solution to a design problem. Where, then, does this leave the constructions of non-human animals? The argument is equally damaging to the conventional biological account, which holds that the outward, phenotypic form – not just of the animal itself, but of the constructions making up its 'extended phenotype' – is the expression of a solution to some specific problem of adaptation, already reached by natural selection, and transferred to the animal at the point of conception, encrypted in the materials of heredity – the genes. That design is thus imported into the organism, as a kind of 'evolved architecture' (Tooby and Cosmides 1992), prior to the organism's development within an environmental context, is indeed one of the great delusions of modern biology. For as I shall show in Chapter Twenty-one, the forms of organisms are in no way prefigured in their genes but are the emergent outcomes of environmentally situated development processes.

For any animal, the environmental conditions of development are liable to be shaped by the activities of predecessors. The beaver, for example, inhabits an environment that has been decisively modified by the labours of its forbears, in building dams and lodges, and will in turn contribute to the fashioning of an environment for its progeny. It is in such a modified environment that the beaver's own bodily orientations and patterns of activity undergo development. The same goes for human beings. Human children, like the young of many other species, grow up in environments furnished by the work of previous generations, and as they do so they come literally to carry the forms of their dwelling in their bodies – in specific skills, sensibilities and dispositions. But they do not carry them in their genes, nor is it necessary to invoke some other kind of vehicle for the inter-generational transmission of information – cultural rather than genetic – to account for the diversity of human living arrangements.

We can now see how, by adopting a dwelling perspective – that is, by taking the animal-in-its-environment rather than the self-contained individual as our point of

departure – it is possible to dissolve the orthodox dichotomies between evolution and history, and between biology and culture. For if, by evolution, we mean differentiation over time in the forms and capacities of organisms, then we would have to admit that changes in the bodily orientations and skills of human beings, insofar as they are historically conditioned by the work of predecessors (along with the enduring products of that work, such as buildings), must themselves be evolutionary. And if, by cultural variation, we mean those differences of embodied knowledge that stem from the diversity of local developmental contexts, then far from being superimposed upon a substrate of evolved human universals, such variation must be part and parcel of the variation of all living things, which has its source in their enmeshment within an all-encompassing field of relations. It is not necessary, then, to invoke one kind of theory, of biological evolution, to account for the transition from nest to hut, and another kind, of cultural history, to account for the transition from hut to skyscraper. For once history is itself recognised as an evolutionary process, the point of origin constituted by the intersection of evolutionary and historical continua disappears, and the search for the first hut – for the beginnings of architecture, history and true humanity – becomes a quest after an illusion.[6]

THE HOUSE AS ORGANISM

Let me conclude by returning to von Uexküll's oak tree. Suppose that it stands, not in the forest, but in the precincts of a house. Now at first glance we might have no hesitation in regarding the house, but not the tree, as a building, or an instance of architecture. For surely the house, as Godelier puts it, belongs to 'that part of nature which is transformed by human action and thought [and] owes its existence to conscious human action on nature' (1986: 5, see also Chapter Five p. 79). The tree, on the other hand, has no such debt to humanity, for it has grown there, rooted to the spot, entirely of its own accord. On closer inspection, however, this distinction between those parts of the environment that are, respectively, built and unbuilt seems far less clear. For the form of the tree is no more given, as an immutable fact of nature, than is the form of the house an imposition of the human mind. Recall the many inhabitants of the tree: the fox, the owl, the squirrel, the ant, the beetle, among countless others. All, through their various activities of dwelling, have played their part in creating the conditions under which the tree, over the centuries, has grown to assume its particular form and proportions. And so, too, have human beings, in tending the tree's surroundings.

But the house also has many and diverse animal inhabitants – more, perhaps, than we are inclined to recognise. Sometimes special provision is made for them, such as the kennel, stable or dovecote. Others find shelter and sustenance in its nooks and crannies, or even build there. And all, in their various ways, contribute to its evolving form, as do the house's human inhabitants in keeping it under repair, decorating it, or making structural alterations in response to their changing domestic circumstances. Thus the distinction between the house and the tree is not an absolute but a relative one – relative, that is, to the scope of human involvement in the form-generating process.[7] Houses, as Suzanne Blier notes (1987: 2), are living organisms. Like trees, they have life-histories, which consist in the unfolding of their relations with both human and non-human components of their environments. To the extent that the influence of the human component prevails, any feature of the environment will seem more like a building; to the extent that the non-human component prevails, it will seem less so.

Building, then, is a process that is continually going on, for as long as people dwell in an environment. It does not begin here, with a pre-formed plan, and end there, with a finished artefact. The 'final form' is but a fleeting moment in the life of any feature, when it is matched to a human purpose, likewise cut out from the flow of intentional activity. As the philosopher Alfred North Whitehead once remarked, 'from the moment of birth we are immersed in action, and can only fitfully guide it by taking thought' (1938: 217). And this applies, with equal force, to 'taking thought about building', the definitive characteristic of the architectural attitude. We may indeed describe the forms in our environment as instances of architecture, but for the most part we are not architects. For it is in the very process of dwelling that we build.

Chapter Eleven

The temporality of the landscape

PROLOGUE

I adhere to the view that social or cultural anthropology, biological anthropology and archaeology form a necessary unity – that they are all part of the same intellectual enterprise. I am not concerned here with the link with biological or 'physical' anthropology, but what I have to say does bear centrally on the unifying themes of archaeology and sociocultural anthropology. I want to stress two such themes, and they are closely related. First, human life is a process that involves the passage of time. Secondly, this life-process is also the process of formation of the landscapes in which people have lived. *Time* and *landscape*, then, are to my mind the essential points of topical contact between archaeology and anthropology. My purpose, in this chapter, is to bring the perspectives of archaeology and anthropology into unison through a focus on the temporality of the landscape. In particular, I believe that such a focus might enable us to move beyond the sterile opposition between the naturalistic view of the landscape as a neutral, external backdrop to human activities, and the culturalistic view that every landscape is a particular cognitive or symbolic ordering of space. I argue that we should adopt, in place of both these views, what I have called a 'dwelling perspective', according to which the landscape is constituted as an enduring record of – and testimony to – the lives and works of past generations who have dwelt within it, and in so doing, have left there something of themselves.

For anthropologists, to adopt a perspective of this kind means bringing to bear the knowledge born of immediate experience, by privileging the understandings that people derive from their lived, everyday involvement in the world. Yet it will surely be objected that this avenue is not open to archaeologists concerned with human activities in the distant past. 'The people', it is said, 'they're dead' (Sahlins 1972: 81); only the material record remains for their successors of our own time to interpret as best they can. But this objection misses the point, which is that *the practice of archaeology is itself a form of dwelling*. The knowledge born of this practice is thus on a par with that which comes from the practical activity of the native dweller and which the anthropologist, through participation, seeks to learn and understand. For both the archaeologist and the native dweller, the landscape tells – or rather *is* – a story, 'a chronicle of life and dwelling' (Adam 1998: 54). It enfolds the lives and times of predecessors who, over the generations, have moved around in it and played their part in its formation. To perceive the landscape is therefore to carry out an act of remembrance, and remembering is not so much a matter of calling up an internal image, stored in the mind, as of engaging perceptually with an environment that is itself pregnant with the past. To be sure, the rules and methods of

engagement employed respectively by the native dweller and the archaeologist differ, as do the stories they tell. Nevertheless, insofar as both seek the past in the landscape, they are engaged in projects of fundamentally the same kind.[1]

It is of course part of an archaeological training to learn to attend to those clues which the rest of us might pass over (literally, when they are below the surface), and which make it possible to tell a fuller or a richer story. Likewise native dwellers, along with their anthropological companions, learn through an education of attention. The novice hunter, for example, travels through the country with his mentors, and as he goes, specific features are pointed out to him. Other things he discovers for himself, in the course of further forays, by watching, listening and feeling. Thus the experienced hunter is the *knowledge-able* hunter (see Chapter Three, pp. 55–6). He can tell things from subtle indications that you or I, unskilled in the hunter's art, might not even notice. Called upon to explicate his knowledge, he may do so in a form that reappears in the work of the non-native ethnographer as a corpus of myths or stories, whereas the archaeologist's knowledge – drawn from the practices of excavation rather than hunting – may appear in the seemingly authoritative form of the site report. But we should resist the temptation to assume that since stories are stories they are, in some sense, unreal or untrue, for this is to suppose that the only real reality, or true truth, is one in which we, as living, experiencing beings, can have no part at all. Telling a story, as I observed in Chapter Three (p. 56), is not like unfurling a tapestry to *cover up* the world, it is rather a way of guiding the attention of listeners or readers *into* it. A person who can 'tell' is one who is perceptually attuned to picking up information in the environment that others, less skilled in the tasks of perception, might miss, and the teller, in rendering his knowledge explicit, conducts the attention of his audience along the same paths as his own.

Following that preamble, I shall now go on to lay out the burden of my argument. This is presented in four principal sections. In the first two, I attempt to specify more precisely what I mean by my key terms – landscape and temporality. I argue that temporality inheres in the pattern of dwelling activities that I call the taskscape. In the third section I consider how taskscape relates to landscape and, ultimately by dissolving the distinction between them, I proceed to recover the temporality of the landscape itself. Finally, I draw some concrete illustrations of my arguments from a well-known painting by Bruegel, *The harvesters*.

LANDSCAPE

Let me be begin by explaining what the landscape is *not*. It is not 'land', it is not 'nature', and it is not 'space'. Consider, first of all, the distinction between land and landscape. Land is not something you can see, any more than you can see the weight of physical objects. All objects of the most diverse kinds have weight, and it is possible to express *how much* anything weighs relative to any other thing. Likewise, land is a kind of lowest common denominator of the phenomenal world, inherent in every portion of the earth's surface yet directly visible in none, and in terms of which any portion may be rendered quantitatively equivalent to any other (Ingold 1986a: 153–4).[2] You can ask of land, as of weight, how much there is, but not what it is like. But where land is thus quantitative and homogeneous, the landscape is qualitative and heterogeneous. Supposing that you are standing outdoors, it is what you see all around: a contoured and textured surface replete with diverse objects – living and non-living, natural and artificial (these distinctions are both problematic, as we shall see, but they will serve for the time being). Thus at any particular moment, you can

ask of a landscape what it is like, but not how much of it there is. For the landscape is a plenum, there are no holes in it that remain to be filled in, so that every infill is in reality a reworking. As Meinig observes, one should not overlook 'the powerful fact that life must be lived amidst that which was made before' (1979a: 44).

The landscape is not 'nature'. Of course, nature can mean many things, and this is not the place for a discourse on the history of the concept. Suffice it to say that I have in mind the rather specific sense whose ontological foundation is an imagined separation between the human perceiver and the world, such that the perceiver has to reconstruct the world, in consciousness, prior to any meaningful engagement with it. The world of nature, it is often said, is what lies 'out there'. All kinds of entities are supposed to exist out there, but not you and I. We live 'in here', in the intersubjective space marked out by our mental representations. Application of this logic forces an insistent dualism, between object and subject, the material and the ideal, operational and cognised, 'etic' and 'emic'. Some writers distinguish between nature and the landscape in just these terms – the former is said to stand to the latter as physical reality to its cultural or symbolic construction. For example, Daniels and Cosgrove introduce a collection of essays on *The iconography of landscape* with the following definition: 'A landscape is a cultural image, a pictorial way of representing or symbolising surroundings' (1988: 1).

I do not share this view. To the contrary, I reject the division between inner and outer worlds – respectively of mind and matter, meaning and substance – upon which such distinction rests. The landscape, I hold, is not a picture in the imagination, surveyed by the mind's eye; nor however is it an alien and formless substrate awaiting the imposition of human order. 'The idea of landscape', as Meinig writes, 'runs counter to recognition of any simple binary relationship between man and nature' (Meinig 1979b: 2). Thus, neither is the landscape identical to nature, nor is it on the side of humanity against nature. As the familiar domain of our dwelling, it is *with* us, not *against* us, but it is no less real for that. And through living in it, the landscape becomes a part of us, just as we are a part of it. Moreover, what goes for its human component goes for other components as well. In a world construed as nature, every object is a self-contained entity, interacting with others through some kind of external contact. But in a landscape, each component enfolds within its essence the totality of its relations with each and every other. In short, whereas the order of nature is explicate, the order of the landscape is implicate (Bohm 1980: 172).

The landscape is not 'space'. To appreciate the contrast, we could compare the everyday project of dwelling in the world with the rather peculiar and specialised project of the surveyor or cartographer whose objective is to *represent* it. No doubt the surveyor, as he goes about his practical tasks, experiences the landscape much as does everyone else whose business of life lies there. Like other people, he is mobile, yet unable to be in more than one place at a time. In the landscape, the distance between two places, A and B, is experienced as a journey made, a bodily movement from one place to the other, and the gradually changing vistas along the route. The surveyor's job, however, is to take instrumental measurements from a considerable number of locations, and to combine these data to produce a single picture which is *independent* of any point of observation. This picture is of the world as it could be directly apprehended only by a consciousness capable of being everywhere at once and nowhere in particular (the nearest we can get to this in practice is by taking an aerial or bird's-eye view). To such a consciousness, at once immobile and omnipresent, the distance between A and B would be the length of a line plotted between two points that are simultaneously in view, that line marking one of any number

of journeys that could potentially be made (cf. Bourdieu 1977: 2). It is as though, from an imaginary position above the world, I could direct the movements of my body within it, like a counter on a board, so that to say 'I am here' is not to point from somewhere to my surroundings, but to point from nowhere to the position on the board where my body happens to be. And whereas actual journeys are made through a landscape, the board on which all potential journeys may be plotted is equivalent to space.[3]

There is a tradition of geographical research (see, for example, Gould and White 1974) which sets out from the premise that we are all cartographers in our daily lives, and that we use our bodies as the surveyor uses his instruments, to register a sensory input from multiple points of observation, which is then processed by our intelligence into an image that we carry around with us, like a map in our heads, wherever we go. The mind, rather than reaching into its surroundings from its dwelling place within the world, might be likened in this view to a film spread out upon its exterior surface. The sense of space implicated in this cartographic view of environmental perception may be illuminated by means of an analogy drawn from the linguistics of Ferdinand de Saussure. To grasp the essence of language, Saussure invites us to picture thought and sound as two continuous and undifferentiated planes, of mental and phonic substance respectively, like two sides of a sheet of paper. By cutting the sheet into pieces (words) we create, on one side, a system of discrete concepts, and on the other, a system of discrete sounds; and since one side cannot be cut without at the same time cutting the other, the two systems of division are necessarily homologous so that to each concept there corresponds a sound (Saussure 1959: 112–13).

Now when geographers and anthropologists write about space, what is generally implied is something closely akin to Saussure's sheet of paper, only in this case the counter-side to thought is the continuum not of phonic substance but of the surface of the earth. And so it appears that the division of the world into a mosaic of externally bounded segments is entailed in the very production of spatial meanings. Just as the word, for Saussure, is the union of a concept with a delimited 'chunk' of sound, so the place is the union of a symbolic meaning with a delimited block of the earth's surface. Spatial differentiation implies spatial segmentation. This is not so of the landscape, however. For a place in the landscape is not 'cut out' from the whole, either on the plane of ideas or on that of material substance. Rather, each place embodies the whole at a particular nexus within it, and in this respect is different from every other.

A place owes its character to the experiences it affords to those who spend time there – to the sights, sounds and indeed smells that constitute its specific ambience. And these, in turn, depend on the kinds of activities in which its inhabitants engage. It is from this relational context of people's engagement with the world, in the business of dwelling, that each place draws its unique significance. Thus whereas with space, meanings are *attached* to the world, with the landscape they are *gathered from* it. Moreover, while places have centres – indeed it would be more appropriate to say that they *are* centres – they have no boundaries. In journeying from place A to place B it makes no sense to ask, along the way, whether one is 'still' in A or has 'crossed over' to B (Ingold 1986a: 155). Of course, boundaries of various kinds may be drawn in the landscape, and identified either with natural features such as the course of a river or an escarpment, or with built structures such as walls and fences. But such boundaries are not a condition for the constitution of the places on either side of them; nor do they segment the landscape, for the features with which they are identified are themselves an integral part of it. Finally, it is important to note that no feature of the landscape is, of itself, a boundary. It can only

become a boundary, or the indicator of a boundary, in relation to the activities of the people (or animals) for whom it is recognised or experienced as such.

In the course of explaining what the landscape is not, I have already moved some way towards a positive characterisation. In short, the landscape is the world as it is known to those who dwell therein, who inhabit its places and journey along the paths connecting them. Is it not, then, identical to what we might otherwise call the environment? Certainly the distinction between landscape and environment is not easy to draw, and for many purposes they may be treated as practically synonymous. It will already be apparent that I cannot accept the distinction offered by Yi-Fu Tuan, who argues that an environment is 'a given, a piece of reality that is simply there', as opposed to the landscape, which is a product of human cognition, 'an achievement of the mature mind' (Tuan 1979: 90, 100). For that is merely to reproduce the dichotomy between nature and humanity. The environment is no more 'nature' than is the landscape a symbolic construct. Elsewhere, I have contrasted nature and environment by way of a distinction between reality *of* – 'the physical world of neutral objects apparent only to the detached, indifferent observer', and reality *for* – 'the world constituted in *relation* to the organism or person whose environment it is' (Ingold 1992a: 44). But to think of environment in this sense is to regard it primarily in terms of *function*, of what it affords to creatures – whether human or non-human – with certain capabilities and projects of action. Reciprocally, to regard these creatures as organisms is to view them in terms of their principles of dynamic functioning, that is as organised systems (Pittendrigh 1958: 394). As Lewontin succinctly puts it (1982: 160), the environment is 'nature organised by an organism'.

The concept of landscape, by contrast, puts the emphasis on *form*, in just the same way that the concept of the body emphasises the form rather than the function of a living creature. If the body is the form in which a creature is present as a being-in-the-world, then the world of its being-in presents itself in the form of the landscape. Like organism and environment, body and landscape are complementary terms: each implies the other, alternately as figure and ground. The forms of the landscape are not, however, prepared in advance for creatures to occupy, any more than are the bodily forms of those creatures independently specified in their genetic make-up. Both sets of forms are generated and sustained in and through the processual unfolding of a total field of relations that cuts across the emergent interface between organism and environment (Goodwin 1988). Having regard to its formative properties, we may refer to this process as one of embodiment.

Though the notion of embodiment has recently come much into fashion, there has been a tendency – following an ancient inclination in Western thought to prioritise form over process (Oyama 1985: 13) – to conceive of it as a movement of *inscription*, whereby some pre-existing pattern, template or programme, whether genetic or cultural, is 'realised' in a substantive medium. This is not what I have in mind, however. To the contrary, and adopting a helpful distinction from Paul Connerton (1989: 72–3), I regard embodiment as a movement of *incorporation* rather than inscription, not a transcribing of form onto material but a movement wherein forms themselves are generated (Ingold 1990: 215). Taking the organism as our focus of reference, this movement is what is commonly known as the life-cycle. Thus organisms may be said to incorporate, in their bodily forms, the life-cycle processes that give rise to them. Could not the same, then, be said of the environment? Is it possible to identify a corresponding cycle, or rather a series of interlocking cycles, which builds itself into the forms of the landscape, and of which the landscape may accordingly be regarded as an embodiment? Before answering this question, we need to turn to the second of my key terms, namely 'temporality'.

TEMPORALITY

Let me begin, once again, by stating what temporality is *not*. It is not chronology (as opposed to history), and it is not history (as opposed to chronology). By chronology, I mean any regular system of dated time intervals, in which events are said to have taken place. By history, I mean any series of events which may be dated in time according to their occurrence in one or another chronological interval. Thus the Battle of Hastings was an historical event, 1066 was a date (marking the interval of a year), and records tell us that the former occurred in the latter. In the mere succession of dates there are no events, because everything repeats; in the mere succession of events there is no time, as nothing does. The relation between chronology and history, in this conception, has been well expressed by Kubler: 'Without change there is no history; without regularity there is no time. Time and history are related as rule and variation: time is the regular setting for the vagaries of history' (1962: 72).

Now in introducing the concept of temporality, I do not intend that it should stand as a third term, alongside the concepts of chronology and history. For in the sense in which I shall use the term here, temporality entails a perspective that contrasts radically with the one, outlined above, that sets up history and chronology in a relation of complementary opposition. The contrast is essentially equivalent to that drawn by Alfred Gell (1992: 149–55) between what he calls (following McTaggart) the A-series, in which time is immanent in the passage of events, and the B-series, in which events are strung out in time like beads on a thread. Whereas in the B-series, events are treated as isolated happenings, succeeding one another frame by frame, each event in the A-series is seen to encompass a pattern of retensions from the past and protentions for the future. Thus from the A-series point of view, temporality and historicity are not opposed but rather merge in the experience of those who, in their activities, carry forward the process social life. Taken together, these activities make up what I shall call the 'taskscape', and it is with the intrinsic temporality of the taskscape that I shall be principally concerned in this section.

We can make a start by returning for a moment to the distinction between land and landscape. As a common denominator in terms of which constituents of the environment of diverse kinds may be rendered quantitatively comparable, I compared land with weight. But I could equally have drawn the comparison with *value* or with *labour*. Value is the denominator of commodities that enables us to say how much any one thing is worth by comparison with another, even though these two things may be quite unlike in terms of their physical qualities and potential uses. In this sense, the concept of value (in general) is classically distinguished from that of *use*-value, which refers to the specific properties or 'affordances' of any particular object, that commend it to the project of a user (Ingold 1992a: 48–9, cf. Gibson 1979:127, Marx 1930: 169). Clearly, this distinction, between value and use-value, is precisely homologous to that between land and landscape. But if we turn to consider the work that goes into the making of useful things, then again we can recognise that whilst the operations of making are indeed as unlike as the objects produced – involving different raw materials, different tools, different procedures and different skills – they can nevertheless be compared in that they call for variable amounts of what may simply be called 'labour': the common denominator of productive activities. Like land and value, labour is quantitative and homogeneous, human work shorn of its particularities. It is of course the founding premise of the labour theory of value that the amount of value in a thing is determined by the amount of labour that went into producing it (I return to this theme in Chapter Seventeen, pp. 326–8).

How, then, should we describe the practices of work in their concrete particulars? For this purpose I shall adopt the term 'task', defined as any practical operation, carried out by a skilled agent in an environment, as part of his or her normal business of life. In other words, tasks are the constitutive acts of dwelling. No more than features of the landscape, however, are tasks suspended in a vacuum. Every task takes its meaning from its position within an ensemble of tasks, performed in series or in parallel, and usually by many people working together. One of the great mistakes of recent anthropology – what Reynolds (1993: 410) calls 'the great tool-use fallacy' – has been to insist upon a separation between the domains of technical and social activity, a separation that has blinded us to the fact that one of the outstanding features of human technical practices lies in their embeddedness in the current of sociality. It is to the entire ensemble of tasks, in their mutual interlocking, that I refer by the concept of *taskscape*. Just as the landscape is an array of related features, so – by analogy – the taskscape is an array of related activities. And as with the landscape, it is qualitative and heterogeneous: we can ask of a taskscape, as of a landscape, what it is like, but not how much of it there is. In short, the taskscape is to labour what the landscape is to land, and indeed what an ensemble of use-values is to value in general.

Now if value is measured out in units of money, and land in units of space, what is the currency of labour? The answer, of course, is *time* – but it is time of a very peculiar sort, one that must be wholly indifferent to the modulations of human experience. To most of us it appears in the familiar guise of clock-time: thus an hour is an hour, regardless of what one is doing in it, or of how one feels. But this kind of chronological time does not depend upon the existence of artificial clocks. It may be based on any perfectly repetitive, mechanical system, including that (putatively) constituted by the earth in its axial rotations and in its revolutions around the sun. Sorokin and Merton (1937), in a classic paper, call it 'astronomical' time: it is, they write, 'uniform, homogeneous; . . . purely quantitative, shorn of qualitative variations'. And they distinguish it from 'social time', which they see as fundamentally qualitative, something to which we can affix moral judgements such as good or bad, grounded in the 'rhythms, pulsations and beats of the societies in which they are found', and for that reason tied to the particular circumstances of place and people (1937: 621–3; see also Chapter Seventeen, pp. 325–6). Adopting Sorokin and Merton's distinction, we could perhaps conclude that whereas labour is measured out in units of astronomical time, or in clock-time calibrated to an astronomical standard, the temporality of the taskscape is essentially social. Before we can accept this conclusion, however, the idea of social time must be examined a little more closely.

In my earlier discussion of the significance of space, I showed that in the cartographic imagination, the mind is supposed to be laid out upon the surface of the earth. Likewise in the chronological perspective, time appears as the interface between mind and 'duration' – by which is meant an undifferentiated stream of bodily activity and experience. Taking time in this sense, Durkheim famously likened it to 'an endless chart, where all duration is spread out before the mind, and upon which all possible events can be located in relation to fixed and determinate guidelines' (1976 [1915]: 10). Rather like Saussure's sheet of paper, it could be compared to a strip of infinite length, with thought on one side and duration on the other. By cutting the strip into segments we establish a division, on the one hand, into calendrical intervals or dates, and on the other hand, into discrete 'chunks' of lived experience, such that to every chunk there corresponds a date in a uniform sequence of before and after. And as every chunk succeeds the next, like frames on a reel

of film, we imagine ourselves to be looking on 'as time goes by', as though we could take up a point of view detached from the temporal process of our life in the world and watch ourselves engaged now in this task, now in that, in an unending series of present instants. Whence, then, come the divisions which give chronological form to the substance of experience? Durkheim's answer, as is well known, was that these divisions – 'indispensable guidelines' for the temporal ordering of events – come from *society*, corresponding to the 'periodical recurrence of rites, feasts, and public ceremonies' (p. 10). Thus for Durkheim, time is at once chronological *and* social, for society itself is a kind of clock, whose moving parts are individual human beings (Ingold 1986b: 341).

This is not, however, the way we perceive the temporality of the taskscape. For we do so not as spectators but as participants, in the very performance of our tasks. As Merleau-Ponty put it, in reckoning with an environment, I am 'at my task rather than confronting it' (1962: 416). The notion that we can stand aside and observe the passage of time is founded upon an illusion of disembodiment. This passage is, indeed, none other than our *own* journey through the taskscape in the business of dwelling. Once again we can take our cue from Merleau-Ponty: 'the passage of one present to the next is not a thing which I conceive, nor do I see it as an onlooker, I effect it' (1962: 421). Reaching out into the taskscape I perceive, at this moment, a particular vista of past and a future; but it is a vista that is available from this moment and no other (see Gell 1992: 269). As such, it *constitutes* my present, conferring upon it a unique character. Thus the present is not *marked off* from a past that it has replaced or a future that will, in turn, replace it; it rather gathers the past and future into itself, like refractions in a crystal ball. And just as in the landscape, we can move from place to place without crossing any boundary, since the vista that constitutes the identity of a place changes even as we move, so likewise can we move from one present to another without having to break through any chronological barrier that might be supposed to separate each present from the next in line. Indeed the features that Durkheim identified as serving this segmenting function – rites, feasts and ceremonies – are themselves as integral to the taskscape as are boundary markers such as walls or fences to the landscape.

The temporality of the taskscape is social, then, not because society provides an external frame against which particular tasks find independent measure, but because people, in the performance of their tasks, *also attend to one another*. Looking back, we can see that Durkheim's error was to divorce the sphere of people's mutual involvement from that of their everyday practical activity in the world, leaving the latter to be carried on by individuals in hermetic isolation. In real life, this is not how we go about our business. By watching, listening, perhaps even touching, we continually feel each other's presence in the social environment, at every moment adjusting our movements in response to this ongoing perceptual monitoring. For the orchestral musician, playing an instrument, watching the conductor and listening to one's fellow players are all inseparable aspects of the same process of action: for this reason, the gestures of the performers may be said to *resonate* with each other. In orchestral music, the achievement of resonance – or what Schutz (1951: 78) called a 'mutual tuning-in relationship' – is an absolute precondition for successful performance. But the same is true, more generally, of social life (Wikan 1992, Richards 1996). Indeed it could be argued that in the resonance of movement and feeling stemming from people's mutually attentive engagement, in shared contexts of practical activity, lies the very foundation of sociality.

Let me pursue the analogy between orchestral performance and social life a little further since, more than any other artistic genre, music mirrors the temporal form of the taskscape.

I want, by means of this analogy, to make three points. First, while there are cycles and repetitions in music as in social life, these are essentially rhythmic rather than metronomic (on this distinction, see Young 1988: 19). It is for precisely this reason that social time, *pace* Durkheim, is *not* chronological. A metronome, like a clock, inscribes an artificial division into equal segments upon an otherwise undifferentiated movement; rhythm, by contrast, is intrinsic to the movement itself. Langer has argued that the essence of rhythm lies in the successive building up and resolution of tension, on the principle that every resolution is itself a preparation for the next building-up (1953: 126–7). There may of course be rests or sustained notes within a piece, but far from breaking it up into segments, such moments are generally ones of high tension, whose resolution becomes ever more urgent the longer they are held. Only our last exhalation of breath is not a preparation for the next inhalation – with that, we die; similarly with the last beat the music comes to an end. Social life, however, is never finished, and there are no breaks in it that are not integral to its tensile structure, to the 'ebb and flow of activity' by which society itself seems to breathe (Young 1988: 53).

My second point is that in music as in social life, there is not just one rhythmic cycle, but a complex interweaving of very many concurrent cycles.[4] While it reflects the temporal form of social life, music in fact represents a very considerable simplification, since it involves only one sensory register (the auditory), and its rhythms are fewer and more tightly controlled. In both cases, however, since any rhythm may be taken as the tempo for any of the others, there is no single, one-dimensional strand of time. As Langer puts it: 'life is always a dense fabric of concurrent tensions, and as each of them is a measure of time, the measurements themselves do not coincide' (1953: 113). Thus the temporality of the taskscape, while it is intrinsic rather than externally imposed (metronomic), lies not in any particular rhythm, but in the network of interrelationships between the multiple rhythms of which the taskscape is itself constituted. To cite a celebrated anthropological example: among the Nuer of southern Sudan, according to Evans-Pritchard, the passage of time is 'primarily the succession of [pastoral] tasks *and their relations to one another*' (1940: 101–2, my emphasis). Each of these relations is, of course, a specific resonance. And so, just as social life consists in the unfolding of a field of relationships among persons who attend to one another in what they do, its temporality consists in the unfolding of the resultant pattern of resonances.

Thirdly, the forms of the taskscape, like those of music, come into being through movement. Music exists only when it is being performed; it does not pre-exist, as is sometimes thought, in the score, any more than a cake pre-exists in the recipe for making it. Similarly, the taskscape exists only so long as people are actually engaged in the activities of dwelling, despite the attempts of anthropologists to translate it into something rather equivalent to a score – a kind of ideal design for dwelling – that generally goes by the name of 'culture', and that people are supposed to bring with them into their encounter with the world. This parallel, however, brings me to a critical question. Up to now, my discussion of temporality has concentrated exclusively on the taskscape, allowing the landscape to slip from view. It is now high time to bring it back into focus. I argued in the previous section that the landscape is not nature; here I claim that the taskscape is not culture. Landscape and taskscape, then, are not to be opposed as nature to culture. So how are we to understand the relation between them? Where does one end and the other begin? Can they even be distinguished at all?

If music best reflects the forms of the taskscape, it might be thought that painting is the most natural medium for representing the forms of the landscape. And this suggests

that an examination of the difference, in the field of art, between music and painting might offer some clues as to how a distinction might possibly be drawn between taskscape and landscape as facets of the real world. I begin by following up this suggestion.

TEMPORALISING THE LANDSCAPE

At first glance the difference seems obvious: paintings do not have to be performed, they are presented to us as works that are complete in themselves. But on closer inspection, this contrast appears more as an artefact of a systematic bias in Western thought, to which I have already alluded, that leads us to privilege form over process. Thus the actual work of painting is subordinated to the final product; the former is hidden from view so that the latter alone becomes an object of contemplation. In many non-Western societies, by contrast, the order of priority is reversed: what is essential is the act of painting itself, of which the products may be relatively short-lived – barely perceived before being erased or covered up. This is so, for example, among the Yolngu, an Aboriginal people of northern Australia, whose experience of finished paintings, according to their ethnographer, is limited to 'images fleetingly glimpsed out of the corner of the eye' (Morphy 1992: 187). The emphasis, here, is on painting as *performance*.[5] Far from being the preparation of objects for future contemplation, it is an act of contemplation in itself. So, too, is performing or listening to music. Thus all at once, the contrast between painting and music seems less secure. It becomes a matter of degree, in the extent to which forms endure beyond the immediate contexts of their production. Musical sound, of course, is subject to the property of rapid fading: speeding outwards from its point of emission, and dissipating as it goes, it is present only momentarily to our senses. But where, as in painting, gestures leave their traces in solid substance, the resulting forms may last much longer, albeit never indefinitely.

Returning now from the contrast between music and painting to that between taskscape and landscape, the first point to note is that no more than a painting is the landscape given ready-made. One cannot, as Inglis points out, 'treat landscape as an object if it is to be understood. It is a living process; it makes men; it is made by them' (1977: 489). Just as with music, the forms of the landscape are generated in movement: these forms, however, are congealed in a solid medium – indeed, to borrow Inglis's words again, 'a landscape is the most solid appearance in which a history can declare itself' (*ibid.*). Thanks to their solidity, features of the landscape remain available for inspection long after the movement that gave rise to them has ceased. If, as Mead argued (1977 [1938]: 97), every object is to be regarded as a 'collapsed act', then *the landscape as a whole must likewise be understood as the taskscape in its embodied form*: a pattern of activities 'collapsed' into an array of features.

But to reiterate a point made earlier, the landscape takes on its forms through a process of incorporation, not of inscription. That is to say, landscape formation is not a matter – as James Weiner would have it (1991: 32) – of transforming 'a sheer physical terrain into a pattern of historically experienced and constituted space and time', as though the physical world pre-existed as a blank slate, a mere substrate of formless materiality, awaiting the impress of cultural significance. Human beings do not, in their movements, inscribe their life histories upon the surface of nature as do writers upon the page; rather, these histories are woven, along with the life-cycles of plants and animals, into the texture of the surface itself (see Chapter Eighteen, pp. 347–8). Thus the forms of the landscape arise alongside those of the taskscape, within the same current of activity. If we recognise a

man's gait in the pattern of his footprints, it is not because the gait preceded the footprints and was 'inscribed' in them, but because both the gait and the prints arose within the movement of the man's walking.

Since, moreover, the activities that comprise the taskscape are unending, the landscape is never complete: neither 'built' nor 'unbuilt', it is perpetually under construction. This is why the conventional dichotomy between natural and artificial (or 'man-made') components of the landscape is so problematic. Virtually by definition, an artefact is an object shaped to a pre-conceived image that motivated its construction, and it is finished at the point when it is brought into conformity with this image. What happens to it beyond that point is supposed to belong to the phase of use rather than manufacture, to dwelling rather than building. But the forms of the landscape are not pre-prepared for people to live in – not by nature nor by human hands – for it is in the very process of dwelling that these forms are constituted. We may recall here Heidegger's remark, already cited in the last chapter, that 'to build is in itself already to dwell' (1971: 146). Thus the landscape is always in the nature of work in progress.

My conclusion that the landscape is the congealed form of the taskscape does enable us to explain why, intuitively, the landscape seems to be what we *see* around us, whereas the taskscape is what we *hear*. To be seen, a thing need do nothing itself, for the optic array that specifies its form to a viewer consists of light reflected off its outer surfaces. To be heard, on the other hand, a thing must actively emit sounds or, through its movement, cause sound to be emitted by other objects with which it comes into contact. Thus, outside my window I see a landscape of houses, trees, gardens, a street and pavement. I do not hear any of these things, but I can hear people talking on the pavement, a car passing by, birds singing in the trees, a dog barking somewhere in the distance, and the sound of hammering as a neighbour repairs his garden shed. In short, what I hear is *activity*, even when its source cannot be seen. And since the forms of the taskscape, suspended as they are in movement, are present *only* as activity, the limits of the taskscape are also the limits of the auditory world. (While I deal here only with visual and aural perception, we should not underestimate the significance of touch, which is important to all of us but above all to blind people, for whom it opens up the possibility of access to the landscape – if only through proximate bodily contact.)

This argument carries an important corollary. Whereas both the landscape and the taskscape presuppose the presence of an agent who watches and listens, the taskscape must be populated with beings who are themselves agents, and who reciprocally 'act back' in the process of their own dwelling. In other words, the taskscape exists not just as activity but as *inter*activity. Indeed this conclusion was already foreshadowed when I introduced the concept of resonance as the rhythmic harmonisation of mutual attention. Having said that, however, there is no reason why the domain of interactivity should be confined to the movements of human beings. We hear animals as well as people, such as the birds and the dog in my example above. Hunters, to take another example, are alert to every sight, sound or smell that reveals the presence of animals, and we can be sure that the animals are likewise alert to the presence of humans, as they are also to that of one another. On a larger scale, the hunters' journeys through the landscape, or their oscillations between the procurement of different animal species, resonate with the migratory movements of terrestrial mammals, birds and fish. Perhaps then, as Reed argues, there is a fundamental difference between our perception of animate beings and inanimate objects, since the former – by virtue of their capacity for autonomous movement – 'are *aware* of their surroundings (including us) and because they *act* on those surroundings (including us)'

(Reed 1988a: 116). In other words, they afford the possibility not only of action but also of interaction (cf. Gibson 1979: 135). Should we, then, draw the boundaries of the taskscape around the limits of the animate?

Though the argument is a compelling one I find it unsatisfactory, for two reasons in particular. First, as Langer observes, 'rhythm is the basis of life, but not limited to life' (1953: 128). The rhythms of human activities resonate not only with those of other living things but also with a whole host of other rhythmic phenomena – the cycles of day and night and of the seasons, the winds, the tides, and so on. Citing a petition of 1800 from the seaside town of Sunderland, in which it is explained that 'people are obliged to be up at all hours of the night to attend the tides and their affairs upon the river', Thompson (1967: 59–60) notes that 'the operative phrase is "attend the tides": the patterning of social time in the seaport follows *upon* the rhythms of the sea'. In many cases these natural rhythmic phenomena find their ultimate cause in the mechanics of planetary motion, but it is not of course to these that we resonate. Thus we resonate to the cycles of light and darkness, not to the rotation of the earth, even though the diurnal cycle is caused by the earth's axial rotation. And we resonate to the cycles of vegetative growth and decay, not to the earth's revolutions around the sun, even though the latter cause the cycle of the seasons. Moreover these resonances are *embodied*, in the sense that they are not only historically incorporated into the enduring features of the landscape but also developmentally incorporated into our very constitution as biological organisms. Thus Young describes the body as 'an array of interlocking (or interflowing) cycles, with their own spheres of partial independence within the solar cycle' (1988: 41). We do not consult these cycles, as we might consult a wrist-watch, in order to time our own activities, for the cycles are inherent in the rhythmic structure of the activities themselves. It would seem, then, that the pattern of resonances that comprises the temporality of the taskscape must be expanded to embrace the totality of rhythmic phenomena, whether animate or inanimate.

The second reason why I would be reluctant to restrict the taskscape to the realm of living things has to do with the very notion of animacy. I do not think we can regard this as a property that can be ascribed to objects in isolation, such that some (animate) have it and others (inanimate) do not. For life is not a principle that is separately installed inside individual organisms, and which sets them in motion upon the stage of the inanimate. To the contrary, as I have argued elsewhere, life is 'a name for *what is going on* in the generative field within which organic forms are located and "held in place"' (Ingold 1990: 215). That generative field is constituted by the totality of organism–environment relations, and the activities of organisms are moments of its unfolding. Indeed once we think of the world in this way, as a total movement of becoming which builds itself into the forms we see, and in which each form takes shape in continuous relation to those around it, then the distinction between the animate and the inanimate seems to dissolve. The world itself takes on the character of an organism, and the movements of animals – including those of us human beings – are parts or aspects of its life-process (Lovelock 1979). This means that in dwelling in the world, we do not act *upon* it, or do things *to* it; rather we move along *with* it. Our actions do not transform the world, they are part and parcel of the world's transforming itself. And that is just another way of saying that they belong to time.

For in the final analysis, everything is suspended in movement. David Reason expresses the point in an eloquent passage that could stand as a summary of all I have argued so far:

Landscapes change; and change is itself an intrinsic aspect of our experience of land-scape. The landscape is a polyrhythmic composition of processes whose pulse varies from the erratic flutter of leaves to the measured drift and clash of tectonic plates. Relative to the human span, the view before us seems composed of fleeting, ephemeral effects which create a patina of transience on apparently stable forms.

(1987: 40)

As this passage reveals, what appear to us as the fixed forms of the landscape, passive and unchanging unless acted upon from outside, are themselves in motion, albeit on a scale immeasurably slower and more majestic than that on which our own activities are conducted. Imagine a film of the landscape, shot over years, centuries, even millennia. Slightly speeded up, plants appear to engage in very animal-like movements, trees flex their limbs without any prompting from the winds. Speeded up rather more, glaciers flow like rivers and even the earth begins to move. At yet greater speeds solid rock bends, buckles and flows like molten metal. The world itself begins to breathe. Thus the rhythmic pattern of human activities nests within the wider pattern of activity for all animal life, which in turn nests within the pattern of activity for all so-called living things, which nests within the life-process of the world.

At each of these levels, as Mae-Wan Ho shows, coherence is founded upon resonance (Ho 1989: 18–20). Reminding us of Whitehead's maxim, that there is 'no holding nature still and looking at it', Ho argues that the world is not anything we can look at but a process that we are part of. Ultimately, then, by re-placing the tasks of human dwelling in their proper context within the process of becoming of the world as a whole, we can do away with the dichotomy between taskscape and landscape – only, however, by recognising the fundamental temporality of the landscape itself.[6]

THE HARVESTERS

In order to provide some illustration of the ideas developed in the preceding sections, I reproduce here a painting which, more than any other I know, vividly captures a sense of the temporality of the landscape. This is *The harvesters*, painted by Pieter Bruegel the Elder in 1565 (Figure 11.1). I am not an art historian or critic, and my purpose is not to analyse the painting in terms of style, composition or aesthetic effect. Nor am I concerned with the historical context of its production. Suffice it to say that the picture is believed to be one of a series of twelve, each depicting a month of the year, out of which only five have survived (Gibson 1977: 147). Each panel portrays a landscape, in the colours and apparel appropriate to the month, and shows people engaged in the tasks of the agricultural cycle that are usual at that time of year. *The harvesters* depicts the month of August, and shows field hands at work, reaping and sheafing a luxuriant crop of wheat, whilst others pause for a midday meal and some well-earned rest. The sense of rustic harmony conveyed in this scene may, perhaps, represent something of an idealisation on Bruegel's part. As Walter Gibson points out, Bruegel was inclined to 'depict peasants very much as a wealthy landowner would have viewed them, as the anonymous tenders of his fields and flocks' (1977: 157–8). Any landowner would have had cause for satisfaction in such a fine crop, whereas the hands who sweated to bring it in may have had a rather different experience. Nevertheless, Bruegel painted during a period of great material prosperity in the Netherlands, in which all shared to some degree. These were fortunate times.
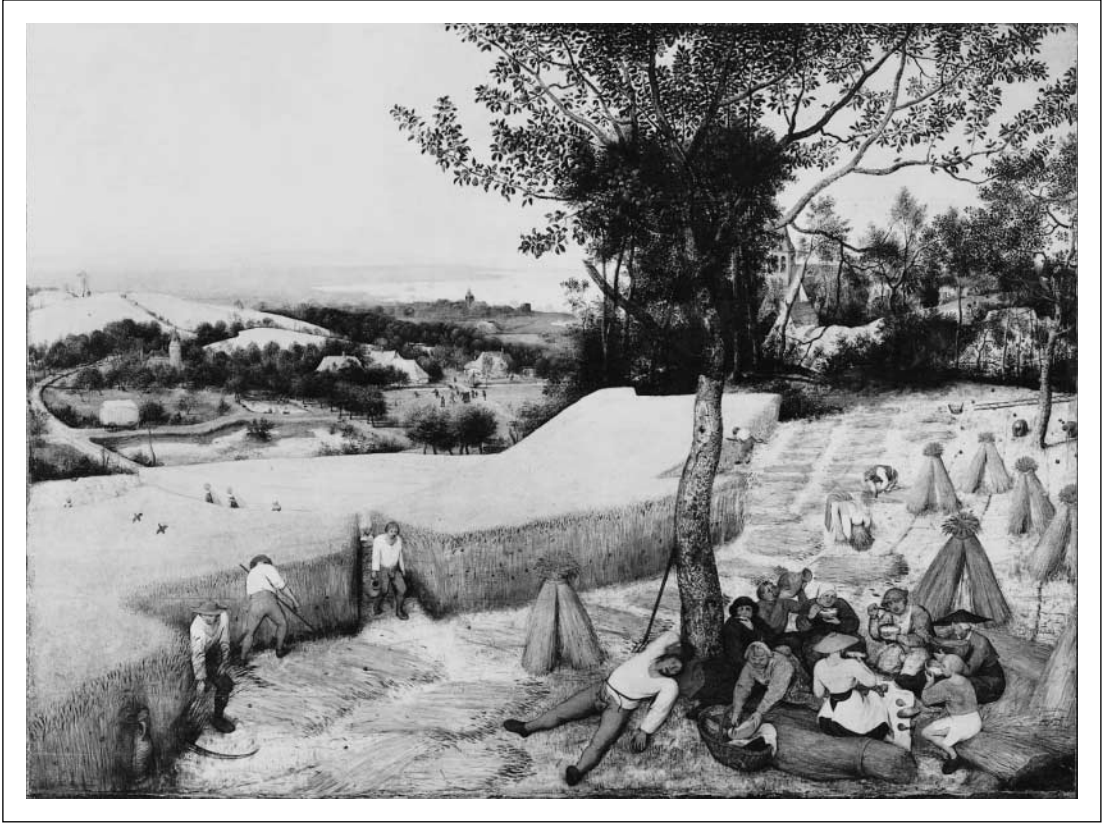
Figure 11.1 *The harvesters* (1565) by Pieter Bruegel the Elder.
The Metropolitan Museum of Art, Rogers Fund, 1919 (19.164).

We are accustomed, by the conventions of modern society, to describe our experience of landscape as though we were viewing a picture. What I am about to suggest, however, is precisely the reverse. Rather than treating the world as its own painting I should like you, the reader, to regard this painting by Bruegel as though it were its own world, into which you have been magically transported. Imagine yourself, then, set down in the very landscape depicted, on a sultry August day in 1565. Standing a little way off to the right of the group beneath the tree, you are a witness to the scene unfolding about you. And of course you hear it too, for the scene does not unfold in silence. So used are we to thinking of the landscape as a picture that we can look *at*, like a plate in a book or an image on a screen, that it is perhaps necessary to remind you that exchanging the painting for 'real life' is not simply a matter of increasing the scale. What is involved is a fundamental difference of orientation. In the landscape of our dwelling, we *look around* (Gibson 1979: 203).[7] In what follows I shall focus on six components of what you see around you, and comment on each insofar as they illustrate aspects of what I have had to say about landscape and temporality. They are: the hills and valley, the paths and tracks, the tree, the corn, the church, and the people.

The hills and valley

The terrain is a gently undulating one of low hills and valleys, grading off to a shoreline that can just be made out through the summer haze. You are standing near the summit of a hill, from where you can look out across the intervening valley to the next. How, then, do you differentiate between the hills and the valley as components of this landscape? Are they alternating blocks or strips into which it may be divided up? Any attempt at such division plunges us immediately into absurdity. For where can we draw the boundaries of a hill except along the valley bottoms that separate it from the hills on either side? And where can we draw the boundaries of a valley except along the summits of the hills that mark its watershed? One way, we would have a landscape consisting only of hills, the other way it would consist only of valleys. Of course, 'hill' and 'valley' are opposed terms, but the opposition is not spatial or altitudinal but kinaesthetic. It is the movements of falling away from, and rising up towards, that specify the form of the hill; and the movements of falling away towards, and rising up from, that specify the form of the valley. Through the exercises of descending and climbing, and their different muscular entailments, the contours of the landscape are not so much measured as *felt* – they are directly incorporated into our bodily experience. But even if you remain rooted to one spot, the same principle applies. As you look across the valley to the hill on the horizon, your eyes do not remain fixed: swivelling in their sockets, or as you tilt your head, their motions accord with the movement of your attention as it follows its course through the landscape. You cast your eyes first downwards into the valley, and then upwards towards the distant hill. Indeed in this vernacular phrase, to 'cast one's eyes', common sense has once again grasped intuitively what the psychology of vision, with its metaphors of retinal imagery, has found so hard to accept: that movement is the very essence of perception. It is *because*, in scanning the terrain from nearby into the distance, your downward glance is followed by an upward one, that you perceive the valley.

Moreover someone standing where you are now would perceive the same topographic panorama, regardless of the time of year, the weather conditions and the activities in which people may be engaged. We may reasonably suppose that over the centuries, perhaps even millennia, this basic topography has changed but little. Set against the duration of human memory and experience, it may therefore be taken to establish a baseline of permanence. Yet permanence, as Gibson has stressed, is always relative; thus 'it is better to speak of persistence under change' (Gibson 1979: 13). Although the topography is invariant relative to the human life-cycle, it is not itself immune to change. Sea-levels rise and fall with global climatic cycles, and the present contours of the country are the cumulative outcome of a slow and long drawn out process of erosion and deposition. This process, moreover, was not confined to earlier geological epochs during which the landscape assumed its present topographic form. For it is still going on, and will continue so long as the stream, just visible in the valley bottom, flows on towards the sea. The stream does not flow between pre-cut banks, but cuts its banks even as it flows. Likewise, as we have seen, people shape the landscape even as they dwell. And human activities, as well as the action of rivers and the sea, contribute significantly to the process of erosion. As you watch, the stream flows, folk are at work, a landscape is being formed, and time passes.

The paths and tracks

I remarked above that we experience the contours of the landscape by moving through it, so that it enters – as Bachelard would say – into our 'muscular consciousness'. Reliving

the experience in our imagination, we are inclined to recall the road we took as 'climbing' the hill, or as 'descending' into the valley, as though 'the road itself had muscles, or rather, counter-muscles' (Bachelard 1964: 11). And this, too, is probably how you recall the paths and tracks that are visible to you now: after all, you must have travelled along at least some of them to reach the spot where you are currently standing. Nearest at hand, a path has been cut through the wheat-field, allowing sheaves to be carried down, and water and provisions to be carried up. Further off, a cart-track runs along the valley bottom, and another winds up the hill behind. In the distance, paths criss-cross the village green. Taken together, these paths and tracks 'impose a habitual pattern on the movement of people' (Jackson 1989: 146). And yet they also arise out of that movement, for every path or track shows up as the accumulated imprint of countless journeys that people have made – with or without their vehicles or domestic animals – as they have gone about their everyday business. Thus the same movement is embodied, on the side of the people, in their 'muscular consciousness', and on the side of the landscape, in its network of paths and tracks. In this network is sedimented the activity of an entire community, over many generations. It is the taskscape made visible.

   In their journeys along paths and tracks, however, people also move from place to place. To reach a place, you need cross no boundary, but you must follow some kind of path. Thus there can be no places without paths, along which people arrive and depart; and no paths without places, that constitute their destinations and points of departure. And for the harvesters, the place to which they arrive, and whence they will leave at the end of the day, is marked by the next feature of the landscape to occupy your attention . . .

The tree

Rising from the spot where people are gathered for their repast is an old and gnarled pear-tree, which provides them with both shade from the sun, a back-rest and a prop for utensils. Being the month of August, the tree is in full leaf, and fruit is ripening on the branches. But this is not just *any* tree. For one thing, it draws the entire landscape around it into a unique focus: in other words, by its presence it constitutes a particular place. The place was not there before the tree, but came into being with it. And for those who are gathered there, the prospect it affords, which is to be had nowhere else, is what gives it its particular character and identity. For another thing, no other tree has quite the same configuration of branches, diverging, bending and twisting in exactly the same way. In its present form, the tree embodies the entire history of its development from the moment it first took root. And that history consists in the unfolding of its relations with mani-fold components of its environment, including the people who have nurtured it, tilled the soil around it, pruned its branches, picked its fruit, and – as at present – use it as something to lean against. The people, in other words, are as much bound up in the life of the tree as is the tree in the lives of the people.[8] Moreover, unlike the hills and the valley, the tree has manifestly grown within living memory. Thus its temporality is more consonant with that of human dwelling. Yet in its branching structure, the tree combines an entire hierarchy of temporal rhythms, ranging from the long cycle of its own germi-nation, growth and eventual decay to the short, annual cycle of flowering, fruiting and foliation. At one extreme, represented by the solid trunk, it presides immobile over the passage of human generations; at the other, represented by the frondescent shoots, it resonates with the life-cycles of insects, the seasonal migrations of birds, and the regular round of human agricultural activities (Davies 1988). In a sense, then, the tree bridges

the gap between the apparently fixed and invariant forms of the landscape and the mobile and transient forms of animal life, visible proof that all of these forms, from the most permanent to the most ephemeral, are dynamically linked under transformation within the movement of becoming of the world as a whole.

The corn

Turning from the pear-tree to the wheat-field, it is no longer a place in the landscape but the surrounding surface that occupies your attention. And perhaps what is most striking about this surface is its uniformity of colour, a golden sheen that cloaks the more elevated parts of the country for as far as the eye can see. As you know, wheat takes on this colour at the particular time of year when it is ripe for harvesting. More than any other feature of the landscape, the golden corn gathers the lives of its inhabitants, wherever they may be, into temporal unison, founded upon a communion of visual experience. Thus whereas the tree binds past, present and future in a single place, the corn binds every place in the landscape within a single horizon of the present. The tree, we could say, establishes a vivid sense of duration, the corn an equally vivid sense of what Fabian (1983: 31) calls *coevalness*. It is this distinction that Bachelard has in mind when he contrasts the 'before-me, before-us' of the forest with the 'with-me, with-us' of fields and meadows, wherein 'my dreams and recollections accompany all the different phases of tilling and harvesting' (Bachelard 1964: 188). You may suppose that the sleeper beneath the tree is dreaming of corn, but if so, you may be sure that the people and the activities that figure in his dream are coeval with those of the present and do not take him back into an encounter with the past.[9]

   Where the corn has been freshly cut, it presents a sheer vertical front, not far short of a man's height. But this is not a boundary feature, like a hedge or fence. It is an interface, whose outline is progressively transformed as the harvesters proceed with their work. Here is a fine example of the way in which form emerges through movement. Another example can be seen further off, where a man is engaged in the task of binding the wheat into a sheaf. Each completed sheaf has a regular form, which arises out of the coordinated movement of binding. But the completion of a sheaf is only one moment in the labour process. The sheaves will later be carried down the path through the field, to the haycart in the valley. Indeed at this very moment, one woman is stooped almost double in the act of picking up a sheaf, and two others can be seen on their way down, sheaves on their shoulders. Many more operations will follow before the wheat is eventually transformed into bread. In the scene before you, one of the harvesters under the tree, seated on a sheaf, is cutting a loaf. Here the cycle of production and consumption ends where it began, with the producers. For production is tantamount to dwelling: it does not begin here (with a pre-conceived image) and end there (with a finished artefact), but is *continuously going on*.

The church

Not far off, nestled in a grove of trees near the top of the hill, is a stone church. It is instructive to ask: how does the church differ from the tree? They have more in common, perhaps, than meets the eye. Both possess the attributes of what Bakhtin (1981: 84) calls a 'chronotope' – that is, a place charged with temporality, one in which temporality takes on palpable form. Like the tree, the church by its very presence constitutes a place, which

owes its character to the unique way in which it draws in the surrounding landscape. Again like the tree, the church spans human generations, yet its temporality is not inconsonant with that of human dwelling. As the tree buries its roots in the ground, so also people's ancestors are buried in the graveyard beside the church, and both sets of roots may reach to approximately the same temporal depth. Moreover the church, too, resonates to the cycles of human life and subsistence. Among the inhabitants of the neighbourhood, it is not only seen but also heard, as its bells ring out the seasons, the months, births, marriages and deaths. In short, as features of the landscape, both the church and the tree appear as veritable monuments to the passage of time.

Yet despite these similarities, the difference may seem obvious. The church, after all, is a *building*. The tree, by contrast, is not built, it grows. We may agree to reserve the term 'building' for any durable structure in the landscape whose form arises and is sustained within the current of human activity. It would be wrong to conclude, however, that the distinction between buildings and non-buildings is an absolute one. Where an absolute distinction is made, it is generally founded on the assumption that built form, rather than having its source within nature, is superimposed by the mind upon it. That assumption, however, presupposes the separation of mind and nature. But from the perspective of dwelling there is no such separation. It is evident, from this latter perspective, that the forms of buildings, as much as of any other features of the landscape, are neither given in the world nor placed upon it, but emerge within the self-transforming processes of the world itself. With respect to any feature, the scope of human involvement in these processes will vary from negligible to considerable, though it is never total (even the most engineered of environments is home to other species). Thus to recall our conclusion from the last chapter, what is or is not a building is a relative matter; moreover as human involvement may vary in the life history of a feature, it may be *more or less* of a building in different periods.

Returning to the tree and the church, it is clearly too simple to suppose that the form of the tree is naturally given in its genetic make-up, whereas the form of the church pre-exists, in the minds of the builders, as a plan which is then realised in stone. In the case of the tree, we have already observed that its growth consists in the unfolding of a total system of relations constituted by the fact of its presence in an environment, from the point of germination onwards, and that people, as components of the tree's environment, play a not insignificant role in this process. Likewise the 'biography' of the church consists in the unfolding of relations with its human builders, as well as with other components of its environment, from the moment when the first stone was laid. The final form of the church may indeed have been prefigured in the human imagination, but it no more issued from the image than did the form of the tree issue from its genes. In both cases, the form is the embodiment of a developmental or historical process, and is rooted in the context of human dwelling in the world.

In the case of the church, moreover, that process did not stop when its form came to match the conceptual model. For as long as the building remains standing in the landscape, it will continue – as it does now – to figure within the environment not just of human beings but of a myriad of other living kinds, plant and animal, which will incorporate it into their own life-activities and modify it in the process. And it is subject, too, to the same forces of weathering and decomposition, both organic and meteorological, that affect everything else in the landscape. The preservation of the church in its existing, 'finished' form in the face of these forces, however substantial it may be in its materials and construction, requires a regular input of effort in maintenance and repair. Once this

human input lapses, leaving it at the mercy of other forms of life and of the weather, it will soon cease to be a building and become a ruin.

The people

So far I have described the scene only as you behold it with your eyes. Yet you do not only look, you listen as well, for the air is full of sounds of one kind and another. Though the folk beneath the tree are too busy eating to talk, you hear the clatter of wooden spoons on bowls, the slurp of the drinker, and the loud snores of the member of the party who is outstretched in sleep. Further off, you hear the swish of scythes against the cornstalks and the calls of the birds as they swoop low over the field in search of prey. Far off in the distance, wafted on the light wind, can be heard the sounds of people conversing and playing on a green, behind which, on the other side of the stream, lies a cluster of cottages. What you hear is a taskscape.

In the performance of their particular tasks, people are responsive not only to the cycle of maturation of the crop, which draws them together in the overall project of harvesting, but also to each other's activities as these are apportioned by the division of labour. Even within the same task, individuals do not carry on in mutual isolation. Technically, it takes only one man to wield a scythe, but the reapers nevertheless work in unison, achieving a dance-like harmony in their rhythmic movements. Similarly the two women carrying sheaves down into the valley adjust their pace, each in relation to the other, so that the distance between them remains more or less invariant. Perhaps there is less co-ordination between the respective movements of the eaters, however they eye each other intently as they set about their repast, and the meal is a joint activity on which all have embarked together, and which they will finish together. Only the sleeper, oblivious to the world, is out of joint – his snores jar the senses precisely because they are *not* in any kind of rhythmic relation to what is going on around. Without wakeful attention, there can be no resonance.

But in attending to one another, do the people inhabit a world of their own, an exclusively *human* world of meanings and intentions, of beliefs and values, detached from the one in which their bodies are put to work in their several activities? Do they, from within such a domain of intersubjectivity, look at the world outside through the window of their senses? Surely not. For the hills and valley, the tree, the corn and the birds are as palpably present to them (as indeed to you too) as are the people to each other (and to you). The reapers, as they wield their scythes, are *with* the corn, just as the eaters are *with* their fellows. The landscape, in short, is not a totality that you or anyone else can look at, it is rather the world in which we stand in taking up a point of view on our surroundings. And it is within the context of this attentive involvement in the landscape that the human imagination gets to work in fashioning ideas about it. For the landscape, to recall the words of Merleau-Ponty (1962: 24), is not so much the object as 'the *homeland* of our thoughts'.

EPILOGUE

Concluding an essay on the ways in which the Western Apache of Arizona discover meaning, value and moral guidance in the landscape around them, Keith Basso abhors the tendency in ecological anthropology to relegate such matters to an 'epiphenomenal' level, which is seen to have little or no bearing on the dynamics of adaptation of human

populations to the conditions of their environments. An ecology that is fully *cultural*, Basso argues, is one that would attend as much to the semiotic as to the material dimensions of people's relations with their surroundings, by bringing into focus 'the layers of significance with which human beings blanket the environment' (Basso 1984: 49). In rather similar vein, Denis Cosgrove regrets the tendency in human geography to regard the landscape in narrowly utilitarian and functional terms, as 'an impersonal expression of demographic and economic forces', and thus to ignore the multiple layers of symbolic meaning or cultural representation that are deposited upon it. The task of decoding the 'many-layered meanings of symbolic landscapes', Cosgrove argues, will require a geography that is not just human but properly *humanistic* (Cosgrove 1989: 120–7).

Though I have some sympathy with the views expressed by these writers, I believe that the metaphors of cultural construction they adopt have an effect quite opposite to that intended. For the very idea that meaning *covers over* the world, layer upon layer, carries the implication that the way to uncover the most basic level of human beings' practical involvement with their environments is by stripping these layers away. In other words, such blanketing metaphors actually serve to create and perpetuate an intellectual space in which human ecology or human geography can flourish, untroubled by any concerns about what the world means to the people who live in it. We can surely learn from the Western Apache, who insist that the stories they tell, far from putting meanings upon the landscape, are intended to allow listeners to place themselves in *relation* to specific features of the landscape, in such a way that their meanings may be revealed or disclosed. Stories help to open up the world, not to cloak it.

And such opening up, too, must be the objective of archaeology. Like the Western Apache – and for that matter any other group of people who are truly 'at home' in the world – archaeologists study the meaning of the landscape not by interpreting the many layers of its representation (adding further layers in the process) but by probing ever more deeply into it. Meaning is there to be *discovered* in the landscape, if only we know how to attend to it. Every feature, then, is a potential clue, a key to meaning rather than a vehicle for carrying it.[10] This discovery procedure, wherein objects in the landscape become clues to meaning, is what distinguishes the perspective of dwelling. And since, as I have shown, the process of dwelling is fundamentally temporal, the apprehension of the landscape in the dwelling perspective must begin from a recognition of its temporality. Only through such recognition, by temporalising the landscape, can we move beyond the division that has afflicted most inquiries up to now, between the scientific study of an atemporalised nature, and the humanistic study of a dematerialised history. And no discipline is better placed to take this step than archaeology. I have not been concerned here with either the methods or the results of archaeological inquiry. However to the question, 'what is archaeology the study *of* ?', I believe there is no better answer than 'the temporality of the landscape'. I hope, in this chapter, to have gone some way towards elucidating what this means.

Chapter Twelve

Globes and spheres
The topology of environmentalism

My purpose in this chapter is no more than to try out a rather embryonic idea. It concerns the significance of the image of the globe in the language of contemporary debate about the environment. Though the image has long been deployed in geopolitical contexts, and even longer in connection with navigation and astronomy, my impression is that its use as a characterisation of the *environment* is rather recent. I have in mind such phrases, which slip so readily off the tongues of contemporary policy-makers, as 'global environmental change'. One is immediately struck by the paradoxical nature of this phrase. An environment, surely, is that which surrounds, and can exist, therefore, only in relation to what is surrounded (Ingold 1992a: 40). I do not think that those who speak of the global environment mean by this the environment surrounding the globe. It is *our* environment they are talking about, the world as it presents itself to a universal humanity. Yet how can humans, or for that matter beings of any other kind, possibly be surrounded by a globe? Would it not be fairer to say that it is we who have surrounded *it*?

My idea is that what may be called the global outlook may tell us something important about the modern conception of the environment as a world which, far from being the ambience of our dwelling, is turned in upon itself, so that we who once stood at its centre become first circumferential and are finally expelled from it altogether (Figure 12.1). In other words, I am suggesting that the notion of the global environment, far from marking humanity's reintegration into the world, signals the culmination of a process of separation.

The image of the globe is familiar to all of us who have gone through a Western schooling and are used to studying models upon which are drawn, in outline, the continents and oceans, and the gridlines of latitude and longitude. We are taught that this is what the earth looks like, although none of us, with a handful of significant exceptions, has ever seen it. By and large, life is lived at such close proximity to the earth's surface that a global perspective is unobtainable. The significant exceptions comprise, of course, that privileged band of astronauts who have viewed the earth from outer space. In a sense,
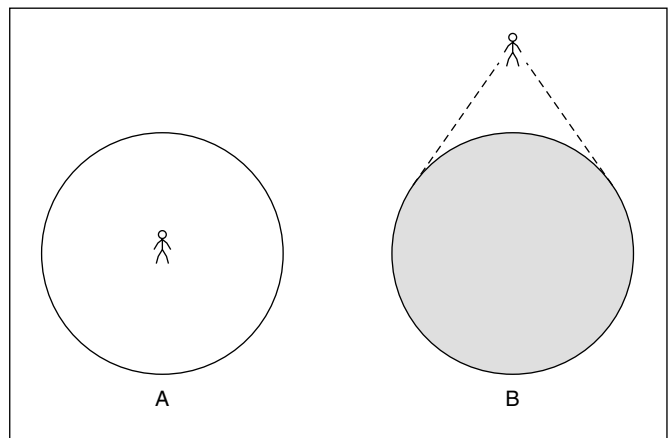
Figure 12.1 Two views of the environment: (A) as a lifeworld; (B) as a globe.
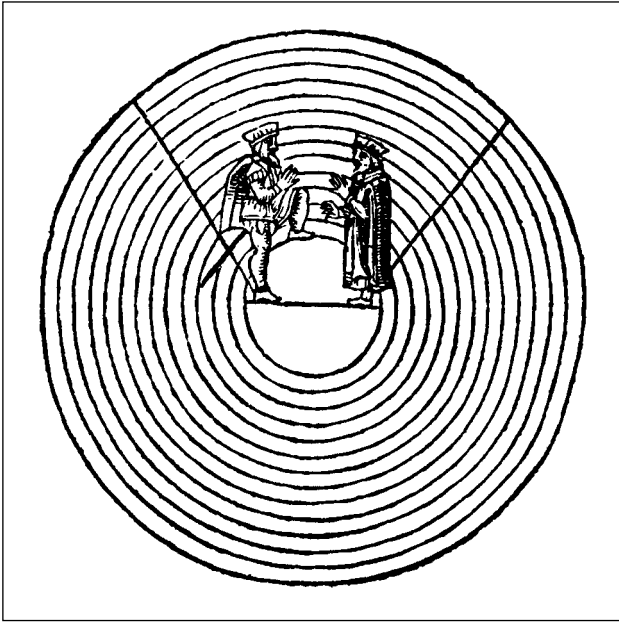
Figure 12.2 The fourteen spheres of the world, as drawn by Giovanni Camillo Maffei of Solofra in his *Scala Naturale* (Venice, 1564). Giovanni's patron, the Count of Altavilla, is shown beginning his ascent through the spheres.

the astronaut's relation to the real globe seen through the window of the spacecraft mirrors the schoolchild's relation to the model globe in the classroom: in both cases the world appears as an object of contemplation, detached from the domain of lived experience. For the child the world is separately encapsulated in the model; for the astronaut life is separately encapsulated, albeit temporarily, in the space module. My point with this comparison is a simple one: with the world imaged as a globe, far from coming into being in and through a life process, it figures as an entity that is, as it were, presented to or confronted by life. The global environment is not a lifeworld, it is a world apart from life.

Before pursuing the implications of this view, I should like to introduce an alternative image of the world which, at least in European thought, is of far more ancient provenance. This is the image of the sphere. Something of the difference in connotation between 'globe' and 'sphere' is suggested in their very acoustic resonance: 'globe' is hard and consonantal; 'sphere' soft and vocalic. A globe is solid and opaque, a sphere hollow and transparent. For the early astronomers, of course, the cosmos itself was seen to be comprised of a series of such spheres, at the common centre of which stood man himself. The idea was that as man's attention was drawn ever outward, so it would penetrate each sphere so as to reach the next. This is illustrated in Figure 12.2, taken from the *Scala Naturale* of Giovanni Camillo Maffei, published in Venice in 1564, and dedicated to the Count of Altavilla. Here there are fourteen concentric spheres which – Maffei tells us – may be envisaged to form a giant stairway, the ascent of which affords, step-by-step, a comprehensive knowledge of the universe. In the picture, the Count is shown taking the first step, under Maffei's direction (see Adams 1938: 58–9).

Unlike the solid globe, which can only be perceived as such from without, spheres – as is clear from this figure – were to be perceived from within. The global view, we might say, is centripetal, the spherical view centrifugal. Nor is it any accident that the perception of the spheres was imaged in terms of listening rather than looking. Visual perception, insofar as it depends on the reflection of light from the outer surface of things, implies both the opacity and inertia of what is seen and the externality of the perceiver. The spheres, being transparent, could not be seen, but undergoing their own autonomous rotations about the common centre, they could be heard: thus the motion of the spheres was supposed to make a harmonious sound that could be registered by the sufficiently sensitive ear. Dating back to Pythagoras and subsequently taken up by Plato and Aristotle, the notion of the 'music of the spheres' was passed on to the Middle Ages through the writings of Boethius, and became integral to the ideas of the Renaissance, starting with Marsilio

Ficino in the fifteenth century (Hallyn 1993: 232). Still today, it is commonly argued that the space of auditory perception is spherical in form, a sphere that surrounds (without enclosing) the listener at its centre. Thus whereas we appear to be on the edge of visual space looking *in* with the eye, we are always at the centre of auditory space listening *out* with the ear (Schafer 1985: 88, 94; cf. Ihde 1976, Carpenter and McLuhan 1960). The globe is to the sphere, according to this argument, as vision is to hearing.[1]

The idea of the spherical cosmos is by no means exclusive to the history of European thought. Let me present one further example, taken from Fienup-Riordan's (1990) account of the lifeworld of the Yup'ik Eskimos. Her cross-sectional depiction of the cosmos as perceived by the Yup'ik, reproduced in Figure 12.3, bears an uncanny resemblance to Maffei's diagram. At the centre is the dwelling, from which roads lead in various directions through the several surrounding spheres.
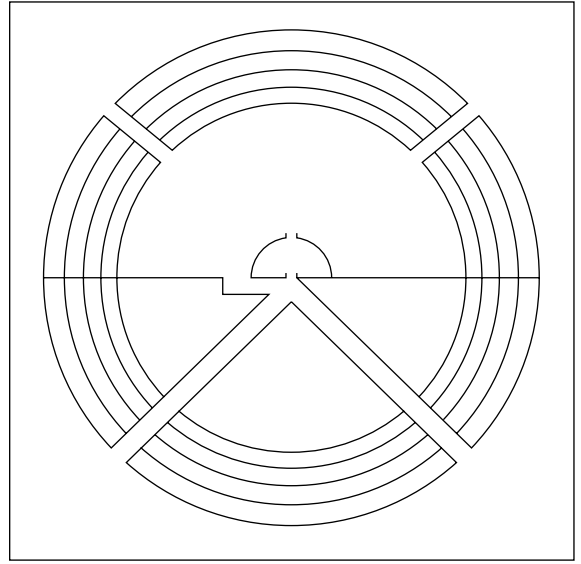
Figure 12.3 Yup'ik cosmology in cross section.

Reproduced from *Eskimo essays: Yup'ik lives and how we see them*, by A. Fienup-Riordan, published by Rutgers University Press, 1990, p. 111.

> A person journeying far enough in any direction would eventually arrive at a point where the earth folded back up into the skyland, the home of the spirits of the game . . . Not only was the earth encompassed by a canopy from above, but below its thin surface resided the spirits of the dead, both animal and human, each in separate villages. Four or five 'steps' separated these two distinct but related domains.
>
> (Fienup-Riordan 1990: 110)

Notice how in this image the surface of the earth, far from bounding the world externally, is but a thin and permeable membrane dividing the world internally, between upper and lower hemispheres.

What I hope to have established, at least in outline, is that the lifeworld, imaged from an experiential centre, is spherical in form, whereas a world divorced from life, that is yet complete in itself, is imaged in the form of a globe. Thus the movement from spherical to global imagery is also one in which 'the world', as we are taught it exists, is drawn ever further from the matrix of our lived experience. It appears that the world as it really exists can only be witnessed by leaving it, and indeed much scientific energy and resources have been devoted to turning such an imaginative flight into an achieved actuality. One consequence is the alleged discrepancy between what, in modern jargon, are called 'local' and 'global' perspectives. Insofar as the latter, afforded to a being outside the world, is seen to be both real and total, the former, afforded to beings-in-the-world (that is, ordinary people) is regarded as illusory and incomplete. Retrieving from my shelves a geology textbook published in 1964 – two years before the earth was first photographed from space – I read on the very first page that 'races of men [whose] horizons are limited to a tribal territory, the confines of a mountain valley, a short stretch of the coast line, or the congested blocks

of a large city' can have no conception of the true nature and extent of the world about them (Putnam 1964: 3). If true knowledge is to be had by looking *at* the world, this statement is self-evidently valid. My point, however, is that this speculist assumption is precisely what has given us the imagery of the world as a globe. And it is this assumption, too, that privileges the knowledge we get from school by looking at model globes over the knowledge we get from life by actively participating in our surroundings.

Do not misunderstand me. I am not some latter-day flat-earther or pre-Copernican. I do not mean to deny that the earth takes the form of a globe – something that has been known, if not universally accepted, at least from the time of Pythagoras – or that it is one of a number of planets revolving around a rather insignificant star. My question is how it came to pass that this globe, the planet we call Earth, was taken to be an environment, or what my geology textbook called 'the world about us'.

We can take a cue from the writings of Immanuel Kant who, in his *Critique of pure reason*, drew a sophisticated analogy between the topological form of the earth and that of the universe as a whole – that is, the 'world' conceived as the domain of all possible objects of knowledge. Kant first places himself in the shoes of one ignorant of the fact that the earth is global in form:

> If I represent the earth as it appears to my senses, as a flat surface, with a circular horizon, I cannot know how far it extends. But experience teaches me that wherever I may go, I always see a space around me in which I could proceed further.
>
> (1933: 606)

One is thus in the hapless position of realising that one's knowledge is limited, but of having no way of knowing just how limited it is. Once it is recognised, however, that the earth is a globe, and given a knowledge of its diameter, it is immediately possible to calculate, from first principles, its surface area. And so, even though – as we traverse the surface – new horizons are always opening up, not only can we work out, by subtraction, how much there remains to be discovered, but also every fresh observation can be slotted into position, in relation to each and every other, within a complete, unifying spatial framework. Thus, to obtain a comprehensive knowledge of the environment, we must already have in mind an image of the globe, or come pre-equipped with what Kant called 'an extended concept of the whole surface of the earth', onto which may be mapped the data of experience (see Richards 1974: 11). Moreover the same applies to knowledge in general, which the mind sees as arrayed upon the surface of a sphere, at once continuous and limited in extent: 'Our reason is not like a plane indefinitely far extended, the limits of which we know in a general way only; but must rather be compared to a sphere, the radius of which can be determined from the curvature of the arc of its surface . . .' (Kant 1933: 607). In this analogy, the topology of the earth's surface comes to stand for the fundamental idea, which the mind is said to bring to experience, of the unity, completeness and continuity of nature. Here, surely, is to be found the very essence of the global outlook.

Let us, then, compare an imaginary Kantian traveller, journeying across the globe in search of new experiences to fit into his overall conception, with the Yup'ik Eskimos, in whose cycles of everyday and seasonal movement the cosmos, as they see it (Figure 12.3), is continually being re-created (Fienup-Riordan 1990: 110–11). For both, the earth provides the ground on which they move, but whereas for the Yup'ik, this movement is conducted within the world, the Kantian traveller, for whom the world is a globe, journeys

upon its outer surface. It is at this surface, the interface between world and mind, sensation and cognition, that all knowledge is constituted. Not only is the surface a continuous one, it also lacks any centre. Anywhere upon it can serve, in principle, equally well as a point of origin or as a destination. Thus if the 'world about us' is the globe, planet earth, it is not a world *within* which we dwell, as is the Yup'ik world depicted with the house at its centre, but one *on* which we dwell. The globe, of course, does have a centre, yet a journey to the centre of the earth, as immortalised in Jules Verne's celebrated novel, is a voyage into the unknown, a domain of strange and terrifying primordial forces.

In short, from a global perspective, it is on the surface of the world, not at its centre, that life is lived.[2] As a foundational level of 'physical reality', this surface is supposed already to have been in existence long before there was any life at all. Then somehow, through a series of events of near-miraculous improbability, there appeared on it first life and then, very much later, consciousness. These appearances are commonly pictured in terms of the addition of extra layers of being to that basic layer represented by the earth's surface: hence the tripartite division into lithosphere, biosphere and noosphere, corresponding respectively to the inorganic substance of rocks and minerals, the organic substance of living things and the superorganic substance of human culture and society.

Although spherical imagery is employed here, the spheres are defined as layered surfaces that successively *cover over* one another and the world, not as successive horizons disclosed from a centre. And the outer wrapping is none other than the human mind and its products. This picture (see Figure 12.4) is the complete obverse of the medieval conception illustrated in Figure 12.2. The difference may be considered in relation to the genesis of meaning. The world which the Count of Altavilla is setting out to explore in Maffei's diagram is itself a world of meaning which, through a kind of sensory attunement, an education of attention, will be gradually revealed to him as he proceeds from one level of understanding to the next. This world – like the world of the Dreaming in Aboriginal Australia (see Chapter Three, p. 56) – has properties of both transparency and depth: not only can one see into it, but also the more one looks the further one sees. By contrast, the world depicted in Figure 12.4, insofar as it corresponds to 'planet Earth', consists of pure substance, physical matter, presenting an opaque and impenetrable surface of literal reality *upon which* form and meaning are overlain by the human mind. That is to say, meaning does not lie in the relational context of the perceiver's involvement in the world, but is rather inscribed upon the outer surface of the world by the mind of the perceiver. To know the world, then, is a matter not of sensory attunement but of cognitive reconstruction. And such knowledge is acquired not by engaging directly, in a practical way, with the objects in one's surroundings, but rather by learning to represent them, in the mind, in the form of a *map*.
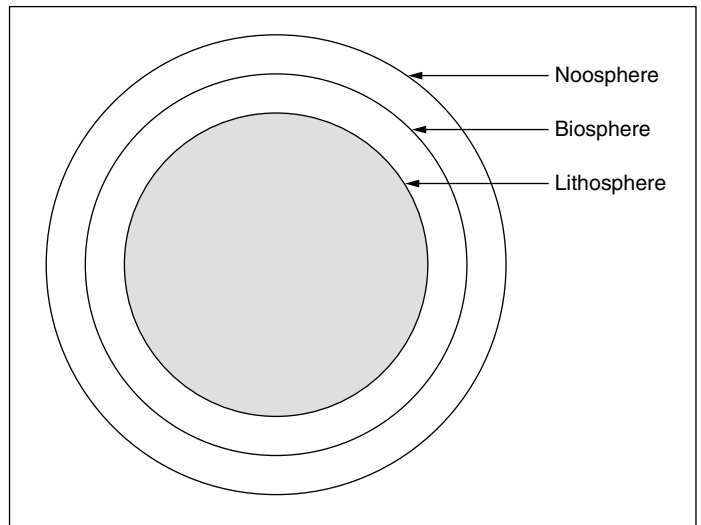

Figure 12.4 Lithosphere, biosphere and noosphere.

I reserve discussion of the notions of mapping and mapmaking for the next chapter. It is sufficient to note, here, the immediate connection between the apprehension of the world as a solid globe and the idea, commonly encountered even in anthropological literature, of the environment as a substrate for the external imposition of arbitrary cultural form. The world becomes a *tabula rasa* for the inscription of human history.

The familiar globes of geography classrooms provide a vivid example of such inscription or covering over. Though the sea is painted blue, the continental land-masses are frequently painted in a mosaic of contrastive colours, representing the territories of nation states. Thus, we are led to think, has the order of human society wrapped itself around the face of the world. Yet that order, we know, has its roots in the history of colonialism, and the attendant voyages of (principally maritime) discovery and exploration. The image of the world as a globe is, I contend, a colonial one. It presents us with the idea of a preformed surface *waiting to be occupied*, to be colonised first by living things and later by human (usually meaning Western) civilisation. Through travel and exploration, it is said, mankind has conquered the globe. Having now filled it up, and still multiplying in numbers at an alarming pace, we are urgently searching around, not just in fantasy but also in fact, for new worlds to colonise. Not only, then, does it appear that the world existed prior to life; it also appears that life can hop from world to world and even – like a parasitic vector flying between successive hosts – exist temporarily in worldless suspension.

The idea that the world exists prior to the forms of life that come to occupy it, and hence that each of these life-forms is itself separately encoded in a context-free vehicle, a kind of free-floating capsule that can carry form from one site of occupation to another, is deeply entrenched in both biological and anthropological thought. In biology it appears as the doctrine of genetic preformation, according to which every organism may be specified, independently of the environmental context of its development, as a unique configuration of self-replicating elements (genes). Through a process of variation under natural selection, organisms are supposed to evolve in ways that make them better adapted to the conditions of their environments, yet the very notion of adaptation implies that these conditions are specifiable in advance, in terms of a set of exogenous parameters quite distinct from the endogenous, genetically fixed parameters of the adapting organisms. There is thus one set of specifications for life, and another set for the world (see Lewontin 1983). In anthropology, cultural information is made to play much the same role as is played by the genes in biology. Again, there is one set of specifications for the forms of life that are carried around – as it used to be said – 'inside people's heads'. And there is another set for the environment, often identified with 'nature' or 'the physical world', upon which these forms are inscribed. And if we ask 'What kind of world is this, that is an environment for every form of life yet external to all of them?', the answer, as we have seen, is planet Earth, the globe.

Moreover, once the world is conceived as a globe, it can become an object of appropriation for a collective humanity. In this discourse, we do not belong to the world, neither partaking of its essence nor resonating to its cycles and rhythms. Rather, since our very humanity is seen to consist, in essence, in the transcendence of physical nature, it is the world that belongs to us. Images of property abound. We have inherited the earth, it is said, and so are responsible for handing it on to our successors in reasonably good condition. But like the prodigal heir, we are inclined to squander this precious inheritance for the sake of immediate gratification. Much of the current concern with the global environment has to do with how we are to 'manage' this planet of ours. That it is ours to manage, however, remains more or less unquestioned. Such management is commonly described

in the language of intervention. But to intervene in the world, as we have already had occasion to note (Chapter Four, p. 63), implies the possibility of our choosing not to do so (Williams 1972: 154). It implies that human beings can launch their interventions from a platform above the world, as though they could live *on* or *off* the environment, but are not destined to live *within* it. Indeed, this rendering of action towards the environment as planned intervention in nature is fundamental to the Western notion of production (see Chapter Three, pp. 58–9). History itself comes to be seen as a process wherein human producers, through their transforming reaction on nature, have literally constructed an environment of their own making.

The idea is epitomised in the title of an influential volume, published in 1956, called *Man's role in changing the face of the earth* (Thomas *et al.* 1956). There are two points about this title to which I wish to draw attention. The first is that with the world envisaged as planet Earth, it is its *face* that is presented to humanity as the substrate for the latter's transforming interventions. This recalls my earlier observation that in the global outlook, life appears to be lived upon the outer surface of the world rather than from an experiential centre within it. The world does not surround us, it lies beneath our feet.[3] The second point concerns the notion of change. It is not of course the case, as was believed by some of the early advocates of uniformitarianism, that the earth has persisted since the beginning of time in homeostatic equilibrium, at least until humans came along to upset the balance. On the contrary, it has been – and continues to be – racked by geological forces acting on such a scale as to make the most impressive feats of human engineering seem puny by comparison. These earth-shaping processes, however, are considered to be immanent in the workings of nature. They are what the world undergoes. But in speaking of the role of humanity, the world appears as an *object* of transformation. Change figures as what is done to the planet by its present owner-occupiers, human beings. It is thus exogenous rather than endogenous, not nature transforming itself, but nature transformed through the imposition of non-natural, human design.

This is what is meant when, in 'changing the face of the earth', the universal agent – 'man' – is said to have replaced the natural environment with one which is, to an ever-greater extent, *artificial*. Thus the construction of the human order appears to entail the destruction of the natural one, as production entails consumption. We are, today, increasingly concerned to limit what are perceived to be the destructive consequences of human activity. My point, however, is that the very notions of destruction and damage limitation, like those of construction and control, are grounded in the discourse of intervention. That is to say, they presume a world already constituted, through the action of natural forces, which then becomes the object of human interest and concern. But it is not a world of which humans themselves are conceived to be a part. To them, it is rather presented as a spectacle. They may observe it, reconstruct it, protect it, tamper with it or destroy it, but they do not dwell in it. Indeed, what is perhaps most striking about the contemporary discourse of global environmental change is the immensity of the gulf that divides the world as it is lived and experienced by the practitioners of this discourse, and the world of which they speak under the rubric of 'the globe'. No-one, of course, denies the seriousness of the problems they address; there is good reason to believe, however, that many of these problems have their source in that very alienation of humanity from the world of which the notion of the global environment is a conspicuous expression.

This point brings me back to the distinction, mentioned earlier, between 'local' and 'global' perspectives. The difference between them, I contend, is not one of hierarchical degree, in scale or comprehensiveness, but one of kind. In other words, the local is not

a more limited or narrowly focused apprehension than the global, it is one that rests on an altogether different mode of apprehension – one based on practical, perceptual engagement with components of a world that is inhabited or dwelt-in, rather than on the detached, disinterested observation of a world that is merely occupied. In the local perspective the world is a sphere, or perhaps a nesting series of spheres as portrayed in Figures 12.2 and 12.3, centred on a particular place. From this experiential centre, the attention of those who live there is drawn ever deeper *into* the world, in the quest for knowledge and understanding. It is through such attentive engagement, entailed in the very process of dwelling, that the world is progressively revealed to the knowledge-seeker. Now different centres will, of course, afford different views, so that while there is only one global perspective, indifferent to place and context, the number of possible local perspectives is potentially infinite. This does not mean, however, that they are in any sense incomplete, or that they represent no more than fragments of a total picture. It is only when we come to represent local differences in terms of a globalising discourse that the centre from which each perspective is taken is converted into a boundary within which every local view is seen to be contained. The idea that the 'little community' remains confined within its limited horizons from which 'we' – globally conscious Westerners – have escaped results from a privileging of the global ontology of detachment over the local ontology of engagement.

To the extent that it has been used to legitimate the disempowerment of local people in the management of their environments, this idea has had serious practical consequences for those amongst whom anthropologists have conducted their studies. To adopt a distinction from Niklas Luhmann (1979), it might be argued that the dominance of the global perspective marks the triumph of technology over cosmology. Traditional cosmology places the person at the centre of an ordered universe of meaningful relations, such as that depicted by Maffei (Figure 12.2), and enjoins an understanding of these relations as a foundation for proper conduct towards the environment. Modern technology, by contrast, places human society and its interests outside what is residually construed as the 'physical world', and furnishes the means for the former's control over the latter. Cosmology provides the guiding principles for human action *within* the world, technology provides the principles for human action *upon* it. Thus, as cosmology gives way to technology, the relation between people and the world is turned inside out (Figure 12.1), so that what was a cosmos or lifeworld becomes a world – a solid globe – externally presented to life. In short, the movement from spherical to global imagery corresponds to the undermining of cosmological certainties and the growing belief in, and indeed dependence upon, the technological fix. It is a movement from revelation to control, and from partial knowledge to the calculated risk.

Let me add one further comment in conclusion. I have written throughout as though the characterisations of the environment, respectively, as globe and sphere were irrevocably opposed, and thus mutually exclusive. But this is not really so, since each view contains the seeds of the other. To regard the world as a sphere is at once to render conceivable the possibility of its logical inverse, the globe; and of course vice versa. We could say that both perspectives are caught up in the dialectical interplay between engagement and detachment, between human beings' involvement in the world and their separation from it, which has been a feature of the entire history of Western thought and no doubt of other traditions as well. Concretely, this is perhaps most clearly manifest in the architectural form of the dome (Smith 1950). A sphere on the inside, a globe on the outside, this form has a cosmic resonance of near-universal appeal. But for any society, at any period of its history, we may expect one perspective to be ascendant, and the other

to be associated with its more or less muted undercurrent. And my sense of the contemporary discourse on the environment in the West is that it continues to be dominated by global imagery associated with the triumph of modern science and technology, but that it is under increasing threat from those – including many anthropologists – who would turn to local or indigenous cosmologies of engagement for sources of insight into our current predicament.

POSTSCRIPT

Since this chapter was written, two further strands have emerged along which I think the argument can be extended. One is to relate the image of the globe, discussed here, with that of the tree, which is currently pervasive in the representation of biodiversity. The second is to show how the distinction between globe and sphere, as alternative topologies of environmental awareness, crosscuts the conventional dichotomy, as it appears in contemporary environmentalist debates, between ecocentrism and anthropocentrism.

The image of living things as arrayed upon the branches of a tree will already be familiar from my discussion of the genealogical model in Chapter Eight (pp. 134–5). The definitive feature of the model, I argued, is that every creature is specified in its essential nature through the bestowal of attributes passed down along lines of descent, independently and in advance of its placement in the world. The idea that the world is presented to life as a surface to be occupied, at once continuous and finite in extent – in short, as the surface of a globe – is simply the obverse of this notion. The intrinsic connection between the geological image of the world as a globe and the biological image of life as a tree is beautifully illustrated in an engraving by Johannes Christian Bendorp, dating from the turn of the nineteenth century (reproduced in Bouquet 1995: Figure 2.6). Said to depict the Tree of Jesse, it shows a bay tree – on whose trunk and branches are arrayed all the descendants of Adam and Eve – springing from a point on the surface of a solid globe. The precise location of this point is immaterial; what is significant, however, is the inscription below, which reads: 'God created the whole family of man from one blood, to inhabit the entire Earth' (Bouquet 1995: 51). Thus the Earth, as a globe, is there to be colonised by those who 'branch out' over it, along their several lines of descent.

Now one of the consequences of the genealogical model, as I showed in Chapter Eight (pp. 138–9), is that difference is rendered as diversity. Thus living things are classified and compared, and their kinds enumerated, in terms of intrinsic properties that they are deemed to possess by virtue of genealogical connection, irrespective of their positioning in relation to one another in an environment. This is the basis for the modern concept of biodiversity. It follows, however, that this very concept is founded in a global perspective. In other words, the mode of apprehension that would reveal the totality of living things as a catalogue of biodiversity is also one that reveals the world as a globe in the purview of a universal humanity. That is why the human species is itself so conspicuously absent from mainstream conceptions of global biodiversity. Species can only be enumerated in the natural world by a humanity that has set itself above and beyond it, and that – being simultaneously everywhere and nowhere – can set the whole of nature in its sights. So far as human differences are concerned, these are typically understood in terms of a concept of cultural diversity that is seen as *analogous* to biodiversity rather than as an extension of it. And the analogy, of course, serves only to reinforce the belief that whatever differences may exist between peoples, on account of their divergent histories of descent, are superimposed upon a humanity that is common to all.

To pick up the second strand: contemporary discussions concerning human rights and responsibilities towards the environment, above all in global geopolitical arenas, have tended to revolve around a pivotal opposition between the positions of so-called *anthropocentrism* and *ecocentrism*. By anthropocentrism is usually meant an attitude which values all things non-human – all inanimate and animate components of the environment barring other people – solely as instrumental means to the realisation of exclusively human ends. Against this, ecocentrism is defined as that attitude which credits the world of nature – and above all, of living things in their interrelationships – with an intrinsic value quite independently of the purposes and activities, and even of the presence, of human beings. Yet despite (or perhaps because of) their conventional opposition, these two positions share more in common than meets the eye. Both presuppose a global perspective. For both, 'there is just one big environment', identified with the order of nature (Cooper 1992: 167). But by its very vastness, this all-embracing environment is profoundly alien to human experience. It is, as David Cooper puts it, 'much too big' to be lived in. One cannot relate to its components. The environment we relate to, by contrast, is the one that surrounds us, that constitutes our milieu and our ambience. And this is spherical rather than global in its topology.[4]

Since we are human, the world around us must necessarily be anthropocentric: this, in itself, implies no lack of participation, nor does it entail an instrumental attitude. Indeed it is decidedly odd that the term 'anthropocentrism' should have been adopted to denote an attitude that, more than any other, *withdraws* human life from active participation in the environment. It is an attitude that might be more accurately described as 'anthropocircumferentialism'. The term may be an impossibly cumbersome one; nevertheless I believe we need it, if only to distinguish the discursive construction of the environment characteristic of modern Western thought and science from the many pre-modern and non-Western cosmologies that are anthropocentric in the strict sense of placing the human being at the hub of a dwelt-in world, a centre of embodied awareness that reaches out, through the activity of the senses, into its surroundings. Thus the shift from anthropocentrism to anthropocircumferentialism is tantamount to the withdrawal of the human presence from the centre to the periphery of the lifeworld (Figure 12.1). And ecocentrism, finally, is just the other side of the coin from anthropocircumferentialism. For once humanity is placed on the outside, *surrounding* the global environment, then the environment – now surrounded rather than surrounding – no longer holds any place for human beings.

To journey along a way of life
Maps, wayfinding and navigation

INTRODUCTION

Everyone has probably had the experience, at some time or other, of feeling lost, or of not knowing in which way to turn in order to reach a desired destination. Yet for most of the time we know where we are, and how to get to where we want to go. Ordinary life would be well-nigh impossible if we did not. It remains a challenge, however, to account for everyday skills of orientation and wayfinding. This challenge is compounded by the considerable potential for misunderstanding surrounding the question of what it actually *means* to know where one is, or the way to go. For the map-using stranger, making his way in unfamiliar country, 'being here' or 'going there' generally entails the ability to identify one's current or intended future position with a certain spatial or geographic location, defined by the intersection of particular coordinates on the map. But a person who has grown up in a country and is conversant with its ways knows quite well where he is, or in what direction to go, without having to consult an artefactual map. What, then, does he have that the stranger lacks? According to a view that has found wide support in the literatures of geography and psychology, there is no difference in principle between them. Both are map-users. For both, knowing where one is means identifying one's position in the world with a location on the map. The difference is just that the native inhabitant's map is held not in the hand but in the head, preserved not on paper but in memory, in the form of a comprehensive spatial representation of his usual surroundings. At any moment, it is supposed, he can access this mental or 'cognitive' map, and determine his location in terms of it.

   In this chapter I shall argue, to the contrary, that there is no such map, and that the belief in its existence is a consequence of the mistaken attribution to native people of a sense of what it means to know one's whereabouts that effectively treats them as strangers in their own country. Indeed the native inhabitant may be unable to specify his location in space, in terms of any independent system of coordinates, and yet will still insist with good cause that he knows where he is. This, as I shall show, is because places do not have locations but histories. Bound together by the itineraries of their inhabitants, places exist not in space but as nodes in a matrix of movement. I shall call this matrix a 'region'. It is the knowledge of the region, and with it the ability to situate one's current position within the historical context of journeys previously made – journeys to, from and around places – that distinguishes the countryman from the stranger. Ordinary wayfinding, then, more closely resembles storytelling than map-using. To use a map is to navigate by means of it: that is, to plot a course from one *location* to another in *space*. Wayfinding, by contrast, is a matter of moving from one *place* to another in a *region*. But while it would

be wrong, or at least misleading, to liken the countryman's knowledge to a map, there is a certain parallel to be drawn between the processes of knowing and mapping. Both are environmentally situated activities, both are carried out along paths of travel, and both unfold over time. Just as wayfinding has to be distinguished from navigation, however, so also mapping must be distinguished from mapmaking. For the designs to which mapping gives rise – including what have been variously categorised as 'native maps' and 'sketch maps' – are not so much representations of space as condensed histories. Thus, to put my thesis in a nutshell, knowing is like mapping, not because knowledge is like a map, but because the products of mapping (graphic inscriptions), as those of knowing (stories), are fundamentally *un*-maplike. What follows is an elaboration of this argument.

COGNITIVE MAPS

At the most general level, the question of how people find their way around may be posed in terms of two alternative metaphors. Following David Rubin (1988: 375), I call the first a complex-structure metaphor, and the second a complex-process metaphor. The former, which has long been dominant in cognitive psychology, holds that even before the individual steps forth into the environment, he has already had copied into his mind – through some mechanism of replication – a comprehensive description of its objects, features and locations, and the relations between them. This, of course, is the cognitive map. Having determined his current whereabouts and desired destination within the map, and having plotted the route between them, his actual movement from place to place is a perfectly straightforward, indeed almost mechanical matter of executing the prescribed course. Getting from A to B, in short, is explained through the harnessing of a simple process, of bodily locomotion, to a complex structure, the mental map. With a complex-process metaphor, on the other hand, little or no pre-structured content is imputed to the mind. Instead, wayfinding is understood as a skilled performance in which the traveller, whose powers of perception and action have been fine-tuned through previous experience, 'feels his way' towards his goal, continually adjusting his movements in response to an ongoing perceptual monitoring of his surroundings. What the first approach explains through positing an isomorphism between structures in the world and structures in the mind, the second explains as the unfolding of a field of relations established through the immersion of the actor-perceiver within a given environmental context. This is the approach favoured by ecological psychology, and it is the one I follow here.

Before pursuing an ecological approach to wayfinding, however, it is worth reflecting on the circumstances in which the notion of the cognitive map came to be introduced in the first place. At that time, some half a century ago, psychology was still in the grip of the behaviourist paradigm. Animals, including human beings, were supposed to respond more or less automatically, in ways conditioned by previous experience, to particular environmental stimuli. Seeking to verify this simple model, psychologists devised numerous experiments in which their star laboratory animal – the humble rat – was induced to run through a variety of mazes. Starved at the outset, having successfully negotiated the maze the rat would be rewarded with food from a box. The idea was that through repeated trials, the animal would learn to take one particular path rather than another at each successive 'choice-point' along the route. The whole route would then be remembered as a chain of conditioned responses, such as right or left turns, triggered by the successive appearance of particular stimuli in the form of gateways in the maze. But rats are enterprising creatures, and they often found ways of subverting the experimenters' intentions.

They would, for example, manage to climb out of the maze near the start by pushing back the cover and then run directly over the top to the food box, where they would climb back down and eat. This caused some consternation in the behaviourist camp, since according to the stimulus–response model they should have had no idea of the direction in which to head off in search of food, knowing no other way than the familiar route through the maze, with all its twists and turns.

To further test the rats' abilities, psychologist Edward C. Tolman and his collaborators devised what they called a 'spatial orientation' experiment (Tolman, Ritchie and Kalish 1946). A maze was first set up as shown in Figure 13.1. Starting at A, the animals had to run across an open circular table, then through the alley CD, and finally along the roundabout route through E and F to reach the food box at G. Once they were accustomed to this, the original maze was replaced with the apparatus shown in Figure 13.2. Starting again at A, the animals ran across the circular table and down the alley, only to find it blocked at one end. After returning to the table and exploring a little way down the other radiating paths, each rat would eventually choose to run all the way out along one of them. The overwhelming majority opted for path number 6 – the path that would take them to precisely the same spot where, in the original set-up, the food box had been located. This experiment seemed to provide convincing evidence that in their training for the first maze, the rats had not merely learned a fixed sequence of steps that would lead them reliably towards their goal. Rather, as Tolman hypothesised, they must have built up 'something like a field map of the environment', upon which could be traced all possible routes and paths and their relationships. Having located their own position and that of the food box in terms of this map, the rats were able to select the path, in the second maze, that led directly from the one to the other. In light of this ability it was clearly inadequate, Tolman reasoned, to liken the animal's central nervous system – as the behaviourists had done – to a telephone switchboard such that every incoming stimulus simply 'dials up' the appropriate response. The brain was to be compared, instead, to a 'map control room' where stimulus-based information would be collected and collated, and where the routes would be plotted that would finally determine the animal's overt behavioural responses (Tolman 1948: 192).

Despite its provocative title, Tolman's 1948 paper – 'Cognitive maps in rats and men' – had much to say about rats but virtually nothing about human beings. Ironically, what little Tolman *did* have to say about humans had nothing to do with their abilities of orientation and wayfinding, but with certain psychopathologies which, he thought, could be attributed to regimes of child training that blocked the development of properly comprehensive cognitive maps. Ending on a high moral tone, Tolman preached that only by inculcating the paramount virtues of reason and tolerance could our
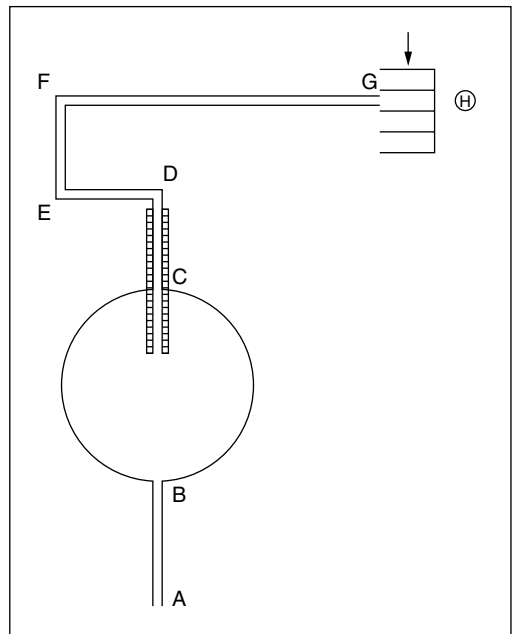
Figure 13.1 The spatial orientation experiment: the original maze.

After Tolman, Ritchie and Kalish, Studies in spacial learning I, *Journal of Experimental Psychology*, 36, 1946.
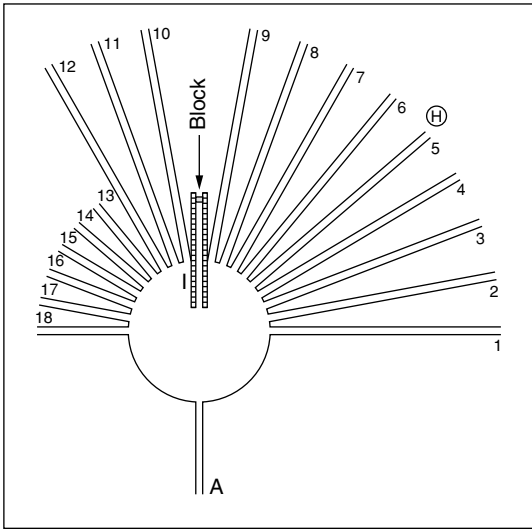
Figure 13.2 The spatial orientation experiment: the replacement maze.

After Tolman, Ritchie and Kalish, Studies in spacial learning I, *Journal of Experimental Psychology*, 36, 1946.

children be furnished with maps sufficiently broad and comprehensive to cope with 'that great God-given maze which is our human world' (1948: 208). It is hard to know what the rats would have made of this! Be that as it may, more recent work by James and Carol Gould on the wayfinding abilities of honey bees helps to put the rats' capacities in perspective. For it turns out that what rats can do, bees can do too: namely, make their way directly to a food source, along a course never taken before. And they can do this without involving anything that we might dignify by terms like 'thought', 'reason' or 'imagination'. The Goulds sound an appropriate note of scepticism when they remark that the calculation a bee would have to undertake in order to plan an optimal route would not be beyond a simple computer. There is no obvious reason why the bee, or for that matter the rat, should have any more of an understanding of the task before it than the computer, or why its solution should call for any intelligence whatsoever (Gould and Gould 1988: 224–5).

Here is what the Goulds did with their bees. First, a group of foragers were trained to fly to a feeding station in some woods out of sight of the hive. Later, individuals about to set off from the hive to the feeder were captured and transported, in an opaque container, to another location well off from their regular route and from which the feeder, likewise, was hidden from view. Here they were released. It was found that the bees flew straight from this location to the feeder, along what can only have been an entirely novel route for them. There is no way in which they could have done this, had they been constrained to follow a fixed sequence of steps between accustomed landmarks – as stipulated by the stimulus-response model. Instead, the Goulds suggest, the bee does what we would do under similar circumstances: 'she would use nearby landmarks to figure out where she is, determine in which direction her goal lies, and then depart directly towards it' (Gould and Gould 1988: 109). She navigates, in other words, in terms of a cognitive map. That humans do likewise was suggested by experiments conducted by Worchel (cited by Oatley 1977: 539–40), who led his subjects blindfold along two sides of a right-angled triangle and then told them to make their way back along the hypoteneuse – a task they completed with considerable accuracy. The ability to update one's position on the cognitive map, and thereby to keep on target despite twists and turns, is – according to Keith Oatley – the basis for any kind of navigation, whether on land or at sea. But whatever the conditions under which it is carried out, navigation 'is a complex cognitive skill' (Oatley 1977: 537).

Comparing what the Goulds say about bees with what Oatley says about humans, we find more than a hint of double standards. Confronted with essentially the same task, its successful accomplishment by humans is attributed to complex skills whereas bees apparently do it on autopilot. I do not mean to deny that human wayfinding is a highly complex, skilled process. But there seems good reason to suppose that it is skilled precisely

to the extent that it goes *beyond* the simple computational operations described by cognitive map theorists. For the environment within which people find their way about is not, as Tolman would have it, a 'great God-given maze', with all its landmarks, routes, openings and obstructions already laid out in advance. It is rather an immensely variegated terrain of comings and goings, which is continually taking shape around the traveller even as the latter's movements contribute to its formation. To hold a course in such an environment is to be attentive at all times to what is going on around you, and to respond in ways that answer to your purpose. This is probably as true of rats, in their ordinary environment, as it is of human beings in theirs. Rats are sensitive and intelligent creatures, and if their performance in experimental mazes manifests a basic computational capacity but no real skill, this is only because the artificial set-up in which they find themselves is a highly impoverished one that deprives them of any opportunity for the exercise of normal powers of discrimination and judgement.

WHAT IS A MAP ANYWAY?

The core assumption of the cognitive approach to orientation and wayfinding is, as we have seen, that perceptually salient aspects of the structure of the world are copied into an analogous structure in the mind (Rubin 1988: 375). This copy is said to be a map, or at least to be maplike in form. But why should this particular metaphor have been adopted, rather than some other? Why maps rather than, say, pictures or images? What is the difference between a map of the world and a picture or image of the world? Any general definition of a map, say Arthur Robinson and Barbara Petchenik, 'must be based on its being simply a representation of things in space' (1976: 15). Yet a perspective drawing would satisfy this criterion, and we would surely not describe such a drawing as a map. One possible approach to defining a map, in contradistinction to the perspectival image, is suggested by Alfred Gell (1985). The approach rests on the idea that maps encode beliefs or propositions about the locations of places and objects that are true (or taken to be true) independently of where one is currently positioned in the world. An example of such a proposition might be that 'Edinburgh is north of London'. One could issue statements to this effect whether one was in London, Edinburgh, or anywhere else for that matter, and they would all be equally valid. In Gell's terms, these statements – each of which is a *token* of the proposition in question – are *non-indexical*, in that their truth conditions are not bound to the place where they are made.

   Accordingly, Gell proceeds to define the map as 'any system of spatial knowledge and/or beliefs which takes the form of non-token-indexical statements about the spatial locations of places and objects' (1985: 278–9). Now a person equipped with knowledge in this form ought, in principle, to be able to figure out just how the world should look from any selected point of observation. If I were hiking in the mountains, for example, I should be able to state how the various peaks would appear arrayed before me, were I standing on a particular summit. Such statements, however, since they hold good only for the view from that summit, and none other, are *indexical* of the place. Any set of beliefs and propositions whose tokens are indexical in this sense, having regard for what is where for a subject positioned at a certain location, comprises what Gell calls an *image* (1985: 280). Thus the difference between the image and the map comes to hinge on the criterion of the indexicality or non-indexicality of its tokens. If our knowledge consisted only of images – that is, of token-indexical spatial propositions – then, to follow Gell's argument, we would never be able to hold any coherent idea about our own location in space, or about

the locations of other places relative to ourselves. We know where we are, not because what we see around us matches to a certain mental image, but because this image has itself been uniquely derived from an underlying map, at a point defined by a given set of spatial coordinates that are indifferent to our own movement. As we travel from one place to another, we pass through a sequence of images, each of which is specific to – and in turn permits us to identify – a particular location along the way. But the map, from which all these images are generated, remains the same wherever we are.

I shall return in due course to what Gell has to say about the nature of navigation and wayfinding. For the moment I want to focus on the implications of this way of distinguishing between the map and the image. It is certainly true, as Gell intimates, that the mere possession of a map, whether mental or artefactual, will not help you to find your way around unless you can use it to generate location-specific images for comparison with immediate perceptual experience. It is also true that no map will do the work that cognitive theorists expect of it unless the information it encodes is invariant with respect to the location of the percipient. Consider Oatley's assertion, for example, that the essence of navigation lies in the 'ability to update one's position within the cognitive map while travelling' (1977: 539). How could this possibly be done if the map keeps changing as one goes along? Oatley himself confuses the issue, when he speaks of the navigator's cognitive map as 'a process, not just a picture' (p. 546). For if the navigator is to look to the map for directions, it can be neither process nor picture, neither embodying his own movement nor representing any particular scenes along the route. 'We only update maps', as Gell observes, 'when the geography of the world changes, not whenever we move about ourselves' (1985: 274). Ultimately, the justification for extending the map metaphor into the domain of cognition must lie in the assumption, more often than not unstated, that what the map affords is a representation of things in space that is independent of any particular point of view.

This assumption, however, raises problems of its own. One of the difficulties that cartographers often face in their attempts to explain the nature of maps is that the very fields, of cognition and communication, from which they might find appropriate analogues have already seized upon the map as an analogue from cartography. 'When non-cartographic writers use the term "map"', as Robinson and Petchenik say, 'they seem to mean that it is possible to take isolated incidents, experiences, and so on, and arrange them intellectually so that there is some coherence, some total relation, instead of individual isolation' (1976: 4). Thus scientists refer to their theories as maps, into which can be fitted the data of observation, while anthropologists are inclined to attribute a similar maplike quality to culture and society (for example, Leach 1976: 51), on the grounds that it furnishes an overarching framework of concepts and categories for the organisation of otherwise fragmentary sensory experience. These, and many other similar metaphorical usages make it appear natural and self-evident that *actual* maps should function in the same way, as schematic representations of the real world, which do not index any position but upon which it should be possible to plot the position of everything in relation to everything else. Now most people in Western societies, educated since their schooldays in the conventions of modern cartography, probably do tend to think of maps as representations of this kind. But whether the artefacts and inscriptions that have at one time or another been designated as maps actually satisfy the requirement of non-indexicality, is moot. The question, in short, is: are maps maplike?

David Turnbull, arguing from the perspective of a sociologist of science, makes a compelling case to the effect that they are not. The idea that maps are independent of

any point of view, that the propositions they encode are equally valid wherever one stands in the world, is, Turnbull contends, a myth – though it is one that has been avidly cultivated in the name of science and objectivity (Turnbull 1989: 15). The reality is that no map, however 'modern' or sophisticated the techniques of its production, can be wholly divorced from the practices, interests and understandings of its makers and users. Or to put it another way, every map is necessarily embedded in a 'form of life'. And to the extent that it is so embedded, it must fail on the criterion of non-indexicality. As Turnbull explains, 'all maps are in some measure indexical, because no map, representation or theory can be independent of a form of life' (1989: 20). At first glance, this argument seems to run directly counter to Gell's insistence that a representation can only be a map insofar as the propositions encoded therein are *non*-indexical. Closer examination, however, reveals a certain slippage in the meaning of indexicality. Is indexing a place the same as indexing a form of life? If the map discloses a perspective or 'point of view', is this a view *in* the world, as it appears from a particular place, or a view *of* the world, filtered through the concepts, categories and schemata of a received cultural tradition? Could a map be non-indexical in the first sense and indexical in the second?

Consider an example to which both Gell and Turnbull refer. Micronesian mariners,[1] who are used to voyaging across hundreds of miles of open sea between often tiny islands, know the bearing of any island from any other by its so-called 'star course' – that is, by a list of stars whose successive rising or setting points, during the night, indicate the direction in question. The expert mariner has committed to memory an entire compendium of star courses, each unique to a particular pair of islands, and it is in this compendium, according to Gell, that his 'map' consists. Now it is clearly the case that any statement of the course between one island A, and another island B, will not depend for its validity on one's current position at sea. Thus star courses 'have the essential map property of non-token-indexicality; they do not change truth value according to where they are uttered' (Gell 1985: 284). Yet it is also fair to say, with Turnbull, that the principles upon which the Micronesian mariner's map is constructed are securely embedded within the percepts and practices of traditional seafaring, and therefore that it requires a knowledge of this cultural context to be able to 'read' and understand the map. It would appear, in short, that while the map indexes a tradition, it is non-indexical with regard to location. The same, moreover, could be said of 'modern' maps, constructed on scientific principles with the aid of sophisticated technological gadgetry. Modern science and technology, as Turnbull remarks (1991: 36), are as dependent on tradition for their successful transmission as is Micronesian seafaring lore. And no more than Micronesian maps can modern maps be understood without taking into account 'the world view, cognitive schema or the culture of the mapmaker' (Turnbull 1989: 20).

There is, however, something deeply paradoxical about this argument. For to separate tradition from locality, or culture from place, is also to divorce traditional knowledge from the contexts of its production in the environmentally situated experience of practitioners. Thus the form of life is reduced to a 'world view' or 'cognitive schema' – a set of rules and representations for the organisation of sensory experience that individuals carry in their heads and that are available for transmission independently of their bodily activity in the world. It is as though culture were *received* along lines of traditional transmission from ancestors, and *imported* into the sites of its practical application. But this is to fall right back into the classical view of culture as a map, the analogy – as Bourdieu (1977: 2) points out – 'which occurs to an outsider who has to find his way around in a foreign landscape and who compensates for his lack of practical mastery, the prerogative of the

native, by the use of a model of all possible routes'. So here is the paradox: actual maps are made to appear indexical with regard to cultural tradition only by a rendering of culture as non-indexical with regard to locality. The placing of maps within their cultural context is paralleled by the *dis*placing of culture from its context in the lifeworld. How, then, are we to resolve this dilemma? How can we hold on to the commonsense notion that maps retain a certain invariance as we move about, that they do not continually recompose themselves to reflect the particularities of wherever we happen to be, while yet recognising their embeddedness in locally situated practices? My answer, in brief, will be that what maps index is *movement*, that the vision they embody is not local but *regional*, but that the ambition of modern cartography has been to convert this regional vision into a *global* one, as though it issued from a point of view above and beyond the world.

How to see the world from everywhere at once

When you stand at a particular spot, everything appears from a certain angle, while much of the environment will likely be hidden from view behind prominent foreground features. Stand at another spot, and things will appear differently. In order to have any conception of the overall configuration of one's environment, it would seem necessary to be in possession of some kind of totalising scheme into which every one of these location-specific perceptual images could be integrated. This, as we have seen, is an argument commonly adduced to justify positing the existence of cognitive maps. It is an argument, however, that assumes a snapshot theory of vision, as if one could only ever see, in perspective, from a fixed point of observation. 'Is not to see', as Merleau-Ponty asks rhetorically, 'always to see from somewhere?' He proceeds to answer, however, in the negative (Merleau-Ponty 1962: 67). To take up his own example, the house next door may be viewed from this side or that, from inside or outside, or even from up above if one were to fly overhead. But what I see is none of these appearances; it is the house *itself*, in all its concrete actuality. The form of the house is progressively disclosed to me as I move around and about, and in and out, not as the sum of a very large number of images, arrayed in memory like frames on a reel of film, but as the envelope of a continually changing perspectival structure. Observation, Merleau-Ponty claims, consists not in having a fixed point of view on the object, but 'in varying the point of view while keeping the object fixed' (1962: 91). Thus the house is not seen from somewhere but from nowhere – or rather from everywhere (pp. 67–9).

   In keeping with his ecological approach to visual perception, James Gibson presents an argument along very similar lines. Animals and people, Gibson writes, see as they move, not just in the intervals between movements. Such ambulatory vision takes place along what he calls a 'path of observation'. A path is to be understood not as an infinite series of discrete points, occupied at successive instants, but as a continuous itinerary of movement. Thus the environment one sees is neither 'seen-at-this-moment' nor 'seen-from-this-point'. On the contrary, 'what one perceives is an environment that surrounds one, that is everywhere equally clear, that is in-the-round or solid, and that is all-of-a-piece' (Gibson 1979: 195–7). But if the features of this environment are revealed as one travels along paths of view, rather than projected from a sequence of points of view, where do these paths begin, and where do they end? And if we see not at this moment in time, but over a certain period, how long is this period? Such questions cannot be precisely answered. Of a minor feature we might say, after only cursory exploration, that we have seen it all. But of a complex, varied and extensive terrain, although we may have criss-crossed it along innumerable paths,

we may still feel there is more to be discovered. As for our perception of the environment as a whole, what else can this be than the outcome of a lifetime's observation, along all the paths we have ever taken? This is what Gibson means when he asserts that perceiving the world over a sufficient length of time, and along a sufficiently extended set of paths, is tantamount to perceiving it 'as if one could be everywhere at once' (p. 197).

It is critically important to distinguish this sense of omnipresence from that implied by the conventional notion of the 'bird's-eye view' (Gibson 1979: 198–9). The latter, of course, has nothing to do with the way birds in flight actually see, but rather describes how we imagine the world would look from a point of observation so far above the earth's surface that the entire territory with which we are familiar from journeys made at ground level could be taken in at a glance. The higher one goes, it is supposed, the more one's vision transcends the locational constraints and narrow horizons of the view from the ground. And by the same token, the more apparently maplike it becomes. Robinson and Petchenik are right to point out that the analogy between the map and the bird's eye view is potentially misleading, not only because of their different geometries of projection, but also because the map is 'a construction, an abstraction, an arrangement of markings that relates to spatial "reality" only by agreement, not by sensory testability' (1976: 53). Nevertheless, anyone who has flown over familiar country by plane will have been astonished, on the one hand, by how strange it looks, and on the other, by how closely the view from the window resembles a topographic map of the same territory. There is nothing strange, however, about the environment perceived from everywhere, in the sense adduced by Merleau-Ponty and Gibson, nor do you have to leave the ground to perceive it in this way. It is not a view from 'up there' rather than 'down here', but one taken *along* the multiple paths that make up a country, and along which people come and go in the practical conduct of life. Our perception of the environment as a whole, in short, is forged not in the ascent from a myopic, local perspective to a panoptic, global one, but in the passage from place to place, and in histories of movement and changing horizons along the way.

The same point could be made, following Edward Casey (1996: 30), through a contrast between *vertical* and *lateral* modes of integration. In the vertical mode, embraced by modern cartography as well as by cognitive map theorists, local particulars obtained by observation on the ground are fitted within an abstract conception of space so as to form a representation of the world as though one were looking down upon it from 'up above'. While the eyes of the body remain close to the ground, the mind's eye – which is witness to this maplike representation – is up with the birds. The lateral mode of integration, by contrast, presupposes no such division between mind and body. For the work of integration is performed by the organism as a whole as it moves around, purposefully and attentively, from place to place. Such movements do not merely connect places that are already located in terms of an independent framework of spatial coordinates. Rather, they bring these places into being as nodes within a wider network of coming and going. Casey refers to this network of interplace movement as a *region* – that is, 'an area concatenated by peregrinations between the places it connects' (1996: 24). Evidently, when Gibson speaks of perceiving the environment from everywhere at once, that 'everywhere' is neither space, nor a portion of space, but a region in this sense. Likewise, every 'somewhere' is not a location in space but a position on a path of movement, one of the matrix of paths comprising the region as a whole. In short, whereas everywhere-as-space is the world as it is imagined from a point of view above and beyond, everywhere-as-region is the world as it is experienced by an inhabitant journeying from place to place along a way of life.

This idea of the region may be illustrated by means of three ethnographic examples. Among the Walbiri, an Aboriginal people of western central Australia, the entire country is perceived 'in terms of networks of places linked by paths' (Munn 1973a: 215). Originally laid down through the movements of ancestral beings in that formative era known as the Dreaming, these paths are continually retraced in the journeys of the living people who take after them. As they relate the stories of these journeys, Walbiri men and women may draw web-like figures in the sand whose basic components are lines and circles. Every line conveys a journey to or from camp, while every circle conveys the act of making camp by walking all around it. Rather similarly for the Ongees, a group of hunter-gatherers inhabiting the island of Little Andaman in the Bay of Bengal, places are brought into being at the confluences of the paths of movement of humans, animals and spirits. Asked by the ethnographer, Vishvajit Pandya, to draw the places where humans and spirits live, Ongee informants responded by sketching lines of movement (straight for humans, wavy for spirits), leading to the demarcation of the various places at their intersections.[2] The world of the Ongees, Pandya concludes, 'is not a preconstituted stage on which things happen, but rather an area or region created and constructed by the ongoing practice of movement' (Pandya 1990: 777). My third example is taken from A. Irving Hallowell's study of the Saulteaux (Ojibwa), hunters and trappers of the Berens River district near Lake Winnipeg in Canada. In Saulteaux experience, to move in a certain direction is always to travel from place to place. This is so not only for human persons, but also for the sun, the moon and the winds, all of which are held to be persons of a kind. Thus 'what we refer to abstractly as cardinal directions are to them the *homes* of the winds, the places they come from. Similarly, east is thought of as the place where the sun rises; west, the place where it sets; south is the place to which the souls of the dead travel, and the place from which the summer birds come' (Hallowell 1955: 191). For the Saulteaux, then, as indeed for the Ongee and the Walbiri, 'everywhere' is not a space but a region concatenated by the place-to-place movements of humans, animals, spirits, winds, celestial bodies, and so on.

Knowing as you go

We can now return to the paradox I introduced earlier. If our knowledge of the environment is embedded in locally situated practices, how come that it retains a certain constancy as we move about? If all knowledge is context-dependent, how can people take their knowledge with them from one context to another? For clues towards a resolution I turn once again to the work of David Turnbull. One of Turnbull's aims is to break down the conventional distinction between so-called indigenous knowledge and Western science. He does so by emphasising that *all* knowledge, of whatever kind and historical provenance, is generated within a 'field of practices' (1989: 61). And since practices must be carried out by particular people in particular places, all knowledge – including that which we call science – must be inherently local. Let me set aside for the time being the contrary thesis, which Turnbull confusingly appears to entertain at the same time, that the context for both indigenous and scientific knowledge is something like a worldview or cognitive schema, by nature detached from the local sites of its practical expression. I have already drawn attention to the dangers of falling back on a concept of culture that divorces knowledge and its transmission from environmentally situated experience. My present concern is with another difficulty in Turnbull's argument. For while on the one hand, he insists that a common characteristic of all knowledge systems is their 'localness', he also argues,

on the other, that what is critical to the growth and reproduction of any knowledge system is the work that goes into moving its diverse components – including practitioners, their know-how and skills, technical devices and standards of evaluation – from one local site of knowledge production to another (Turnbull 1993a: 30).

Consider the case of Western science. According to what might be called the 'official' view of science, data recorded by means of standardised procedures in diverse locations are fitted into a framework of theory consisting of propositions that are strictly non-indexical with regard to place. What happens in practice, however, is a good deal more messy. Not only is it unclear where data collection ends and theory building begins, but also there is no unified body of theory under which all of experience can be subsumed. Rather, there are as many theoretical growth-points as there are sites of practical investigation, and the character of each is conditioned by circumstances peculiar to each place. Much of the labour of science, Turnbull argues, lies in attempts to establish the connectivity and equivalence that would render procedures developed and results obtained in one local context applicable in another (1993a: 37). But if science calls for the constant movement of personnel, knowledge and techniques from place to place, and the assemblage, in each, of inputs of heterogeneous provenance, how can it also share the characteristic of localness? As a system of knowledge, science cannot be rooted in any particular place or places, but must rather emerge from the total network of interplace relations constituting its field of practice. Furthermore, if that is so for science, then it should be equally so for any other knowledge system. As Turnbull himself puts it, 'all knowing is like travelling, like a journey between the parts of a matrix' (1991: 35). So what is this matrix? It is, of course, a *region* in the sense defined above – that is, as the sum of journeys made.

My point is that knowing, like the perception of the environment in general, proceeds along paths of observation. One can no more know *in* places than travel in them. Rather, knowledge is regional: it is to be cultivated by moving along paths that lead around, towards or away from places, from or to places elsewhere. Conceived as the ensemble of such place-to-place movements, the notion of region, far from denoting a level of generalisation intermediate between local particulars and global universals, offers a way out of this kind of dichotomous and hierarchical thinking. As every place, through the movements that give rise to it, enfolds its relations to all others, to be somewhere *is* to be everywhere at once. Rephrased in our terms, what Turnbull proposes is a compelling argument to the effect that all knowledge systems, including science, are integrated laterally rather than vertically. The philosopher Joseph Rouse makes much the same point in arguing that 'we go from one local knowledge to another rather than from universal theories to their particular instantiations' (Rouse 1987: 72). In light of the foregoing considerations, I would prefer to say that we *know as we go*, from place to place. This does not, however, alter the basic point, which is that science is distinguished from other systems of knowledge by the lengths to which it goes to present itself *as if* it were vertically integrated, as if the scientist's task were to fit data to theory rather than to put the knowledge that has brought him to one place to work in setting off towards another. To create this illusion, science has to suppress, or to hide from view, the social labour involved in establishing equivalences and connections across places (Turnbull 1996: 62). In this, moreover, it is aided and abetted by modern cartography, which has been similarly concerned to establish its scientific credentials through its claim to produce accurate and objective representations of a world 'out there'.

Cartographers, like scientists, and indeed like practitioners of any other knowledge system, draw their material from all manner of sources, through both direct observation

and inquiry into local tradition. The collection and collation of this material may take them – or agents operating on their behalf – on innumerable and often lengthy journeys. None of this, however, appears in the final form of the modern, 'scientific' map. To the contrary, one of the most striking characteristics of the modern map is its elimination, or erasure, of the practices and itineraries that contributed to its production (Turnbull 1996: 62). In the words of Michel de Certeau, 'the map, a totalising stage on which elements of diverse origin are brought together to form a tableau of a "state" of geographical knowledge, pushes away into its prehistory or into its posterity, as if into the wings, the operations of which it is the result or the necessary condition' (1984: 121). Just as science, in the official view, is charged with the task of integrating site-specific data into an overarching, unified framework of theory, so the mission of cartography is ostensibly one of representing the 'geographic facts' on the ground within a single, universal system of spatial coordinates (Edney 1993: 55). The ideal is a perfect congruence between the world and its representation, and progress is measured by the degree of approximation towards it. Thus in the work of the modern cartographer, knowledge generated through movement from place to place within a region is presented *as if* it issued from a totalising vision above and beyond the world. In short, cartography transforms everywhere-as-region, the world as experienced by a mobile inhabitant, into everywhere-as-space, the imaginary 'bird's-eye view' of a transcendent consciousness.

The same transformation, of course, is worked on the ordinary perception of the environment by the theory of cognitive maps. As in the modern artefactual map, so too in its 'mental' analogue, all those movements of coming and going through which people develop a knowledge of their environment are pushed into the wings, to recall de Certeau's phrase, leaving the map as a *fait accompli*, final and complete, the product of a process of making that begins with the layout of the world and ends with that layout copied into the mind. Any journeys undertaken beyond that point are supposed to belong to the phase of map-using rather than mapmaking, and therefore to play no further part in the formation of the map itself. The traditional Micronesian seafarer, in this view, is just as much a map-user as is the modern marine navigator with his charts and compass, even though his skill 'is entirely mental and perceptual, using no instruments of any kind' (Oatley 1977: 537). But whereas modern artefactual maps have their authors, designers or manufacturers, the origins of traditional mental maps appear lost in the mists of time. Indeed to say of such maps that they are 'traditional' is virtually tantamount to an admission that they have no maker or makers, but rather that they 'make themselves' – or that like myths, following Lévi-Strauss's celebrated aphorism, they 'think themselves out' through the medium of men's minds and without their knowledge (Lévi-Strauss 1966a: 56). In any case the assumption is that the map is made before it is used, that it already exists as a structure in the mind, handed down as part of a received tradition, prior to the traveller's venturing forth into the world.

My contention, to the contrary, is that people's knowledge of the environment undergoes continuous formation in the very course of their moving about in it. To return to a distinction which I introduced at the outset, this is to account for such knowledge in terms of the generative potentials of a complex process rather than the replication of a complex structure. That process consists in the engagement of the mobile actor-perceiver with his or her environment. As I have already suggested, we know *as* we go, not *before* we go. Such ambulatory knowing – or knowledgeable ambulating – cannot be accommodated within the terms of the conventional dichotomy between mapmaking and map-using. The traveller or storyteller who knows as he goes is neither making a map

nor using one. He is, quite simply, *mapping*. And the forms or patterns that arise from this mapping process, whether in the imagination or materialised as artefacts, are but stepping stones along the way, punctuating the process rather than initiating it or bringing it to a close. My perspective, in short, accords with what Robert Rundstrom has called 'process cartography', in which mapping is seen as 'open-ended, ongoing, always leading to the next instance of mapping, the next map' (Rundstrom 1993: 21). In what follows, I first show in more detail how mapping differs from mapmaking. I then turn to the distinction between mapping and map-using. All wayfinding, I argue, is mapping; all navigation map-using. Thus mapping is to map-using as wayfinding to navigation. The overall structure of the argument is summarised in Figure 13.3.
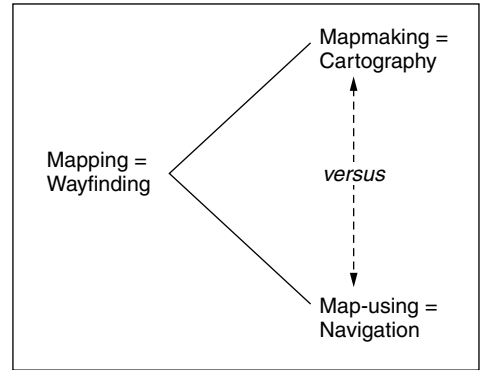

Figure 13.3 The relations between mapping, mapmaking and map-using: a summary.

Mapping is not mapmaking

'Mapping' and 'mapmaking', according to Denis Wood, 'do not mean the same thing' (1992: 32). The difference, in his view, is akin to that between speaking and writing. Wood thinks of mapping as a *capacity* universal to humans, established along with other capacities of the human mind-brain through a process of evolution under natural selection. But the fact that all human beings are capable of mapping does not mean that they all make maps. Likewise, just because all humans can speak does not mean they all write. Whereas mapping, like speaking, might be regarded as a 'universal expression of individual existence', mapmaking, like writing, has to be seen as 'an unusual function of specifiable social circumstances arising only within certain social structures' (Wood 1993a: 50). In other words, the emergence of mapmaking belongs not to the evolution of humanity but to its history. Yet the difference between mapping and mapmaking, just as that between speaking and writing, is for Wood a very fine one. It is not the difference between outwardly expressing an idea and 'capturing' that expression in an alternative medium. For one thing, mapping is no more the externalisation of a map that already exists in the mapper's head than is speaking the externalisation of a thought. Rather, both mapping and speaking are genres of performance that draw their meanings from the communicative contexts of their enactment. It follows, for another thing, that neither mapmaking nor writing can serve to transcribe pre-existent thoughts or mental representations onto paper. The map, like the written word, is not, in the first place, the transcription of anything, but rather an *inscription*. Thus mapping gives way to mapmaking at the point, not where mental imagery yields an external representation, but where the performative gesture becomes an inscriptive practice (Wood 1993a: 53).

Wood illustrates his argument with a nice example. Two boys have been playing rollerblade hockey. At home over dinner, one explains the layout of the court by gesturing with his hands and fingers over a place mat. The other does the same at school, to impress a friend, but in this case (it is during an art class) he gestures with pencil in hand, over a sheet of paper. Whereas nothing remains of the first boy's gestures on the mat, those of the second leave a trace in the form of an inscription, a sketch-map, that can be preserved and reproduced indefinitely beyond the context of its production. We may

suppose that the two boys were of equal ability, and moreover that the first would have had ready access to pencil and paper had he needed it. So why did the second make a map and the first not? The answer, for Wood, lies in the nature of the communicative situation. In general, just as much as in this exemplary instance, it is the situation – at once social and political – that calls for the map. And while the difference between gesturing with an inscribing tool and gesturing without might seem slight, the socio-political consequences are immense. It is the 'fine line of . . . inscription', Wood concludes, 'that differentiates . . . mapping . . . from mapmaking, and mapping *societies* from mapmaking *societies*, in the latter of which it is the inscriptive property of the artefactual map that permits it to serve the interests of the power elites who control the mapmaking process (as well as those who would contest them)' (1993a: 53).

Now while I agree with Wood that there is an important distinction to be made between mapping and mapmaking, I would draw it along different lines. Before doing so, however, we need to be more precise about the meaning of mapping. Wood himself seems unable to make up his mind whether the term refers to a cognitive capacity, to actual movement in the environment, or to the narrative reenactment of journeys made. At one point he tells us that mapping 'is the way we humans make and deploy mental maps' (1992: 32), while at another he dismisses the concept of the mental map only to declare that mapping 'is really just . . . getting around' (1993a: 53). Yet in his example of the two boys, mapping appears to consist neither in having a pre-existent 'map in the head', nor in bodily movement on the ground, but in a kind of retrospective storytelling. It seems to me that the notion of an evolved capacity for mental mapping is deeply flawed. One could hardly expect any such capacity to spring, fully formed, from an individual's genetic make-up, in advance of his or her entry into the lifeworld. It would rather have to undergo development in the very unfolding of the individual's life within an environment. Thus the life-historical process of 'getting around' – or in a word, wayfinding – would appear to be a condition for the emergence of a 'mapping capacity', rather than a consequence of its application. This leaves us with the third sense of mapping – the retelling of journeys made (or possibly the rehearsal for journeys to be made) – as perhaps the most appropriate. I admit, however, that the distinction between wayfinding and mapping is not hard and fast. For one way of retelling the story of a journey is to retrace one's steps, or the steps of ancestors who made the journey in the past. In effect, since travelling from one place to another means remembering the way, all wayfinding is mapping, though not all mapping is wayfinding. I return to this point below.

For the time being, let us continue to regard mapping as the re-enactment, in narrative gesture, of the experience of moving from place to place within a region. In this sense, both boys in Wood's example were engaged in mapping. The fact that one left no trace whereas the other produced a lasting inscription has no appreciable bearing on the nature of the activity as such. The sketch-map that emerged, as the trace of the second boy's gestures, was a more or less incidental by-product of the mapping process, not its ultimate goal. Rundstrom makes much the same point in his account of mapping among Inuit of the central and eastern Canadian Arctic. An Inuit traveller, returning from a trip, could recount every detail of the environment encountered along the way, miming with his hands the forms of specific land and sea features. Such gestural performance, after a long journey, could last many hours. It could also, given appropriate tools and materials, generate an inscription. Many of these inscriptions were produced at the instigation of Western explorers who made contact with the Inuit. They were often astonished at the accuracy of what they regarded as 'native maps'. But for Inuit mappers it was the performance that mattered

– 'the recapitulation of environmental features' – rather than any material artefacts or inscriptions to which it gave rise (Rundstrom 1990: 165). Undoubtedly the vast majority of maps that have ever been produced in human societies, like those of the Inuit, have been improvised on the spot within a particular dialogic or storytelling context, and without any intention for their preservation or use beyond that context. This applies, for example, to the web-like sand drawings of the Walbiri, to which I have already referred (Munn 1973b: 196). 'Most maps for most of the time', as Wood observes, 'have probably been ephemeral, scratched in sand or snow, or, if committed to a more permanent medium, immediately crunched up and thrown away' (1993b: 83, see Lewis 1993: 99).

In the course of producing such a map, the mapper takes his interlocutors on a tour of the country, and as he does so his moving hand, which may or may not hold an inscribing implement, traces out the paths taken and the sights or landmarks encountered along the way. Of the maps produced in aboriginal times by the Saulteaux, Hallowell notes that 'their purpose was not to delineate a section of the country as such, but to indicate a route to be followed, and the emphasis was upon a succession of landmarks roughly indicated in their relations to one another' (Hallowell 1955: 195). Malcolm Lewis's studies of native North American and Inuit maps have shown that they invariably rest on deictic principles: that is, they *point* to things, revealing aspects of how they look as one proceeds along a path of observation from 'here' to 'there' (Lewis 1993: 102). Even in contemporary Western societies, whose inhabitants are bombarded on a daily basis with images founded upon cartographic geometries of plane projection – where they live, as Wood puts it, 'map-immersed in the world' (1992: 34) – people continue to describe their environment, to themselves and others, by retracing the paths of movement they customarily take through it rather than by assigning each of its features to a fixed location in space. 'When we are asked for directions', as Barbara Belyea notes, 'few of us can resist pointing and waving our arms, or tracing the traveller's route over the surface of his map. *The gesture becomes a part of the map*, a feature of its reception' (Belyea 1996: 11, my emphasis). It may be misleading, Belyea suggests, to liken the inscriptive process to writing, as though the purpose of the exercise were to represent the features of the landscape in the same way that writing is supposed to represent the spoken word. For the graphs on the map are not representations of anything. Every line is rather the trace of a gesture, which itself retraces an actual movement in the world. To read the map is therefore to follow the trace as one would the path of the hand that made it.[3]

The analogy between mapping and writing, however, may be closer than Belyea thinks. For much of its history, at least in the Western world, writing was understood not as the representation of speech but as a means by which what has been said or told could be committed to memory (Carruthers 1990). Throughout the Middle Ages, as David Olson notes, 'written records were thought of and treated as reminders rather than representations' (Olson 1994: 180). And the same was true of medieval maps, which served as memoranda of itineraries, providing directions and advice to the traveller who would undertake the same journey (de Certeau 1984: 120). In the history of writing as in that of mapping, remembering gradually gave way to representation over the same period – from the fifteenth to the seventeenth century – that also saw the rise of modern scientific discourse. De Certeau has shown how, in the course of this transition, the map 'slowly disengaged itself from the itineraries that were the conditions of its possibility'. For some time, maps would continue to be illustrated with pictures of ships, landforms, people and beasts of various descriptions, winds and currents, and the like. Subsequently dismissed as quaint decorations, these figures were really fragments of stories, telling of the journeys,

and the incidents that took place along them, from which the map resulted. But eventually, the map won out over these pictorial figurations, eliminating all remaining traces of the practices that produced it (de Certeau 1984: 120–1). Thus the making of maps came to be divorced from the experience of bodily movement in the world.[4] The cartographer has no need to travel, indeed he may have no experience whatever of the territory he so painstakingly seeks to represent. His task is rather to assemble, off-site, the information provided to him – already shorn of the particular circumstances of its collection – into a comprehensive spatial representation. It is of course no accident that precisely the same task is assigned, by cognitive map theorists, to the mind in operating upon the data of sense.

It is at the point where maps cease to be generated as by-products of story-telling, and are created instead as end-products of projects of spatial representation, that I draw the line between mapping and mapmaking. In effect, mapmaking suppresses, or 'brackets out', both the movements of people as they come and go between places (wayfinding), and the re-enactment of those movements in inscriptive gesture (mapping). It thereby creates the appearance that the structure of the map springs directly from the structure of the world, as though the mapmaker served merely to mediate a transcription from one to the other. I call this the cartographic illusion (see Figure 13.4). One aspect of this illusion lies in the assumption that the structure of the world, and so also that of the map which purports to represent it, is fixed without regard to the movement of its inhabitants. Like a theatrical stage from which all the actors have mysteriously disappeared, the world – as it is represented in the map – appears deserted, devoid of life. No-one is there; nothing is going on. Suppose, for example, that I describe a journey I have made by tracing a path with my finger over the surface of a topographic map. Once the map has been folded and put away, nothing of this would remain. So far as the map's representation of the world is concerned, I may as well have never made the trip. Had I, alternatively, traced my path with a pencil, the resulting lines would be deemed to have added nothing to the map, but rather to have defaced it. To restore the map, they would have to be rubbed out! Either way, *my gesture does not become part of the map* but is excluded from it, as is my original movement from the world it represents.[5] This is in marked contrast to the maps of native North American Indians and Inuit, as described by such scholars as Lewis, Rundstrom and Belyea, which actually *grow*, line by line, with every additional gesture. So do the charts used by Micronesian seafarers, which 'literally get larger, coconut-palm rib by cowrie shell, and stick by stone'
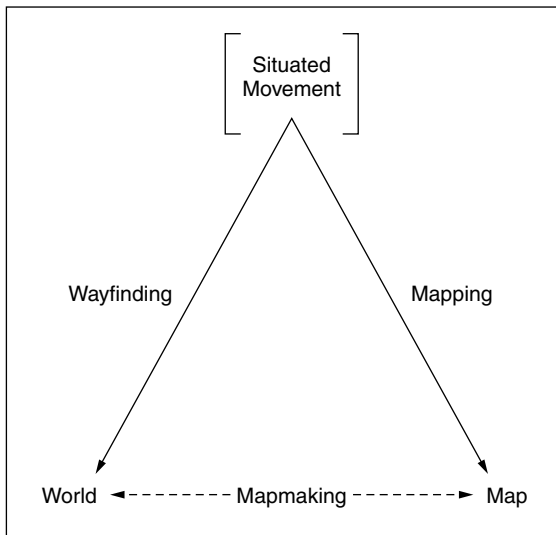
Figure 13.4 The cartographic illusion. The environmentally situated movement entailed in both wayfinding and its narrative re-enactment (mapping) is bracketed out to create the illusion that the form of the map arises, in mapmaking, as a direct transcription of the layout of the world.

(Wood 1992: 31). And so, too, do our own sketch-maps. In these instances the development of the map, as a 'pattern of interconnected lines' (Belyea 1996: 6), parallels that of the region, as a network of coming and going. But the modern topographic map does not grow or develop, it is *made*. And just as the process of its production is eliminated from the final form of the product, so the world it describes is not a world in the making, but one ready-made for life to occupy.

It is this, finally, that lies behind the distinction between the map and the picture, as alternative descriptions of the same country. For those of us schooled in the conventions of modern cartography, the distinction may seem obvious enough. Maps are supposed to furnish an objective record of the disposition of things in space, that is strictly independent of any point of view, whereas pictures show how these things might be experienced by a subject positioned somewhere in that space, or moving through it (Turnbull 1989: 15). It is widely believed, as Svetlana Alpers observes, that 'maps give us the measure of a place and the relationship between places, quantifiable data, while landscape pictures are evocative, and aim rather to give us some quality of a place or the viewer's sense of it. One is closer to science, the other is art'. Anything on the map that evokes the experience of place or movement is dismissed by the scientific cartographer as 'mere decoration'; anything in the picture that conveys factual information about spatial location is dismissed by the artist as 'mere topography' (Alpers 1983: 124–6). But for the Dutch painters and draughtsmen of the seventeenth century, who are the subjects of Alpers's study, these boundaries between maps and pictures, and between science and art, would have made little sense. Mapping and picturing were, for them, one and the same, having as their common aim 'to capture on a surface a great range of knowledge and information about the world' (1983: 122). As mapmaking triumphed over mapping, however, and as cartographers sought to dissociate themselves professionally from artists, so maps were stripped of their pictorial attributes. Thus historians of cartography, viewing the development of mapmaking in retrospect, are able to present it as having progressed from being an 'art' to being a 'science', replacing subjective fancy with hardwon and independently verifiable factual information (Edney 1993: 56). Art, in the words of Brian Harley, was gradually 'edged off the map' (Harley 1989: 4). But to edge art off the map is also to edge human actor-perceivers off the world, to push their direct, sensory experience into the wings, and to consign their narratives of movement and travel to the realms of fable, fantasy and hallucination.

WAYFINDING IS NOT NAVIGATION

'Navigation', writes Edwin Hutchins, 'is a collection of techniques for answering a small number of questions, perhaps the most central of which is "Where am I?"' (Hutchins 1995: 12). So – to return to a question I raised at the outset – what does it mean to know where one is? What would one need to know in order to feel that the question has been satisfactorily answered? First of all, according to Hutchins, one must possess some representation of space – a map – whether internal or external, inscribed in the mind or on a sheet of paper, within which every object or feature in one's environment is assigned a determinate location. One has then to be able to establish a coherent set of correspondences between what is depicted on the map and what is visible in one's surroundings. From these it should be possible to identify one's current position in the world with a specific location on the map. Only then has the question of where one is been answered (Hutchins 1995: 12–13). Alfred Gell, in an article to which I have already referred, argues

along much the same lines. To know where one is, in Gell's view, it is not enough to have formed a perceptual image of the environment as seen from some place. This image has to be matched to that generated from the map (mental or artefactual) at a particular spatial location. 'Navigation', according to Gell, 'consists of a cyclic process whereby images generated from maps are matched up against perceptual information, and perceptual images are identified with equivalent coordinates on a map' (1985: 280). This process of matching is essentially the same as what Hutchins means by 'establishing correspondences', such as, for example, when we say 'this here' (pointing to contours on the map) corresponds to 'that there' (pointing to the outline of a hill on the horizon).

Now while Gell takes as his principal ethnographic example the classic case of Micronesian seafaring, Hutchins chose to study the practices of nautical navigation on board a large modern naval vessel. Both writers insist, however, that reduced to its bare essentials, navigation is a cognitive task that all of us face all the time as we find our way about, whether at sea or on land. Navigational techniques may of course be distinguished, as Gell admits, both in terms of their complexity and the volume of information handled, and in terms of the extent to which this information is published or transmitted by rote memorisation. But none of this, he claims, alters the fact that 'the essential logical processes involved in all way-finding, from the most elementary and subliminal, to the most complex and laborious, are identical' (Gell 1985: 286). For Hutchins, likewise, we are all navigators in our everyday lives, as the following passage reveals:

> When the navigator is satisfied that he has arrived at a coherent set of correspondences, he might look to the chart and say 'Ah, yes; I am here, off this point of land.' *And it is in this sense that most of us feel we know where we are.* We feel that we have achieved reconciliation between the features we see in our world and a representation of that world.
>
> (1995: 13, my emphasis)

Yet as soon as Hutchins takes us on board ship, and introduces us to the work of the navigators on the bridge, things look rather different. For it turns out that establishing correspondences between features on the chart and features in the environment is extremely difficult, and calls for specialised skills that can only be acquired through lengthy training and hands-on experience. To reconcile the chart with the territory, as Hutchins explains, one has to imagine how the world would look from a point of view – that of the 'bird's eye' – from which it is never actually seen, save from an aircraft or satellite. The ordinary passenger, untutored in the techniques of navigation, is quite unable to do this, and may confess to being baffled by maps and charts. He cannot, in other words, translate from his on-board experience of motion as 'moving through a surrounding space' to the depiction of motion on the chart as 'that of an object moving across a space'. Navigators, on the other hand, become so used to thinking of the movement of the ship from this peculiar perspective – as if they were manoeuvring it about like a counter on a game-board – that they find it difficult to imagine this movement, any more, from the ordinary passenger's perspective (Hutchins 1995: 62).

I intend to argue, in accord with Hutchins's ethnography but contrary to his general claim, that we are no more navigators in our everyday lives – in finding our way around in a familiar environment – than we are cartographers when we retrace these movements in narrative. Navigation (or map-*using*) is, I contend, as strange to the ordinary practices of wayfinding as is cartography (or map*making*) to ordinary practices of mapping. It would be

hard to imagine why we should find the navigator's charts so baffling, or why his skills should be so specialised, if they were but analogues of cognitive structures and capacities that we use all the time. Thus Gell, along with others who have had resort to the notion of cognitive maps, is surely wrong to regard wayfinding and navigation as processes of a similar or even identical kind. For when we move about, we do not normally think of ourselves as piloting our bodies across the surface of the earth, as the navigator pilots his ship across the ocean. Nor do we have to think in this way in order to know, at any moment, where we are. This is because the question 'Where am I?' is not ordinarily answered in terms of a location in space, determined by the intersection of an independent set of coordinates. Hutchins to the contrary, it is *not* in this sense that most of us feel we know where we are. Indeed I may know precisely where I am and yet have no idea of my geographic location. For it is not by assigning the position where I currently stand to certain spatial coordinates that an answer to the 'where' question is arrived at, but rather by situating that position within the matrix of movement constitutive of a region.

To amplify this point, let me compare two, admittedly fictional, scenarios. In the first you are walking with a friend through unfamiliar terrain, equipped with a topographic map. Arriving at a place that affords a good panoramic view, your friend stops to ask, 'Where are we?' You look around, pointing to various landmarks which you proceed to correlate with markings on the map. Finally, indicating with a finger a particular spot on the map's paper surface, you declare 'We are here'. In the second scenario, you are walking in familiar country around your home, with a companion who is a stranger to the area. Once again, on arrival at a certain place, your companion puts the same question, 'Where are we?' You may respond in the first instance with a place-name. But then, realising that the name alone leaves him none the wiser, you might go on to tell a story about the place – about your own association with it, about other people who have lived and visited there, and about the things that happened to them. Now in the second case you have no need to consult an artefactual map, nor would it be of any avail to you, not because you have resort instead to a map inside your head, but because knowing your present whereabouts has nothing to do with fixing your location in space. As someone who has lived in a country, and is used to its ways, knowing where you are lies not in the establishment of a point-to-point correspondence between the world and its representation, but in the remembering of journeys previously made, and that brought you to the place along the same or different paths. In the first scenario, of course, you have no knowledge of this kind. Having never visited the country before you do not know where you are, in the sense you do when on home ground, even though you may be able to locate your own position, and that of everything else, with pin-point accuracy on your map.

For those who know a country, in short, the answers to such basic questions as 'Where am I?' and 'Which way should I go?' are found in narratives of past movement. It is in this respect, as noted earlier, that wayfinding and mapping become one and the same: to follow a path is also to retrace one's steps, or the steps of one's predecessors. And in this respect, too, wayfinding differs fundamentally from navigation, just as mapping differs from map-using. For when navigating in a strange country by means of a topographic map, the relation between one's position on the ground and one's location in space, as defined by particular map coordinates, is strictly synchronic, and divorced from any narrative context. It is possible to specify where one is – one's current location – without regard to where one has been, or where one is going. In ordinary wayfinding, by contrast, every place holds within it memories of previous arrivals and departures, as well as expectations of how one may reach it, or reach other places from it. Thus do places enfold the passage

of time: they are neither of the past, present or future but all three rolled into one. Endlessly generated through the comings and goings of their inhabitants, they figure not as locations in space but as specific vortices in a current of movement, of innumerable journeys actually made. Taking this view of place as my starting point, I now want to show how wayfinding might be understood not as following a course from one spatial location to another, but as a movement in *time*, more akin to playing music or story-telling than to reading a map.

PATHS, FLOWS AND THE PASSAGE OF TIME

The inspiration for this move comes from Gibson, and follows from his insight – which I explored in an earlier section – that the environment is perceived not from multiple points of view but along a path of observation. Rejecting both of the dominant psychological approaches to wayfinding, as chains of conditioned responses to environmental stimuli and as navigation by means of cognitive maps, Gibson proposes an alternative, 'the theory of reversible occlusion' (1979: 198). In brief, the theory states that one knows the way in terms of the specific order in which the surfaces of the environment come into or pass out of sight as one proceeds along a path. Suppose, for example, that you are walking along a street in town, or through a valley in the countryside. The surfaces you can see – the facades of buildings in the one case, or the ground rising on either side in the other – comprise a *vista*. As Gibson explains, a vista is 'a semienclosure, a set of unhidden surfaces, . . . what is seen from here, with the proviso that "here" is not a point but an extended region'. But now, as you turn the corner into another street, or reach the brow of the ridge at the head of the valley, a new set of surfaces, previously hidden, looms into view, while those of the original vista disappear from sight. The passage from one vista to another, during which the former is gradually occluded while the latter opens up, constitutes a *transition*. Thus to travel from place to place involves the opening up and closing off of vistas, in a particular order, through a continuous series of reversible transitions. It is through this ordering of vistas, Gibson maintains, that the structure of the environment is progressively disclosed to the moving observer, such that he or she can eventually perceive it from everywhere at once (Gibson 1979: 198–9).

Gibson's notion of wayfinding through reversible occlusion has been further developed in recent work by psychologist Harry Heft (1996). We have already seen how the forms of environmental features are revealed as the envelopes of a continually modulating perspective structure along a path of observation. Now this flow of perspective structure, as Heft points out, also specifies the observer's own movements relative to the layout of the environment. As every path of travel gives rise to its own distinctive flow pattern, so every such pattern uniquely specifies a certain path. To find one's way, Heft argues, means to travel along a particular route so as to generate or recreate the flow of perspective structure peculiar to the path leading to one's destination (1996: 122). One remembers the route as a succession of vistas connected by transitions, rather as one might remember a piece of music as a series of thematic sections linked by bridge passages. Just as with musical performance, wayfinding has an essentially *temporal* character (1996: 112): the path, like the musical melody, unfolds over time rather than across space. In this connection, it is important to remind ourselves of Gibson's contention that every path should be conceived as a unitary movement, and not as a potentially infinite set of adjacent points (Gibson 1979: 197). In music, a melodic phrase is not just a sequence of discrete tones; what counts is the rising or falling of pitch that gives shape to the phrase as a whole. Likewise in wayfinding,

the path is specified not as a sequence of point-indexical images, but as the coming-into-sight and passing-out-of-sight of variously contoured and textured surfaces.

In this respect, too, the theory of wayfinding advanced here differs profoundly from that which Gell has caricatured under the rubric of 'mapless practical mastery', and which he attributes, *inter alia*, to Bourdieu (Gell 1985; see Bourdieu 1977: 2). 'We can suppose', writes Gell, 'that practical mastery of the environment consists of possessing complete knowledge of what the environment looks like from all practically-available points of view'. The master traveller, equipped with such knowledge, remembers the journey from A to B as a 'chain of linked landscape images', each particular to a certain point along the route, selected from the total stock of images filed in memory. As he proceeds on his way he will pause, every so often, to check that what he sees from the spot where he stands corresponds to the image he has on file (Gell 1985: 274–5). Our argument, to the contrary, is that mastery consists in knowing what the environment looks like from all practically available *paths* of view, that what the traveller remembers are vistas and transitions rather than location-specific images, and that keeping track is a matter of regenerating the flow of perspective structure over time. Now for Gell the theory of mapless practical mastery, taken on its own, could not possibly work, since it would leave the traveller bereft of any means to formulate navigational decisions. It is all very well to know that you are currently where you ought to be – that what you see around you matches your expectations for a certain stage in your journey. But this alone will not tell you in which direction to go to reach the next checkpoint. Nor, if what you see does *not* match any of the images in the chain for the particular journey you are making, do you have any way of working out how to get back on track. In short, to go from A to B, or from any point to any other along the way, you need to be able to ascertain their relative locations in space. And this, Gell reasons, requires a map.

If it were true that all wayfinding consisted of navigation between fixed points, Gell's argument would be unassailable. But it is not. Ordinary movement in a familiar environment lacks the stop-go character of navigation, in which every physical or bodily manoeuvre (displacement in space) is preceded by a mental or calculative one (fixing the course). 'Finding one's way' is not a computational operation carried out prior to departure from a place, but is tantamount to one's own movement through the world. To recapitulate my earlier point, we know *as* we go, not *before* we go. Thus the operation is not complete until one has reached one's final destination: only then can the traveller truly claim to have found his way. The notion of 'finding' has here to be understood in its original sense of exploratory movement, at once improvisatory and assured, guided by past experience and by a continual monitoring of fluctuations not only in the pattern of reflected light but also in the sounds and 'feel' of the environment. There is no better illustration of this than the example that Gell himself uses in an attempt to prove, to the contrary, that wayfinding is based on the execution of pre-formulated 'navigational decisions' (1985: 282). This is the case of Micronesian seafaring. In a classic paper on the subject, Thomas Gladwin describes how, at every moment during a voyage, the mariner is attentive to 'a combination of motion, sound, feel of the wind, wave patterns, star relationships, etc.', all of which – through comparison with remembered observations from past experience – translates into 'a slight increase or decrease in pressure on the steering paddle, or a grunted instruction to slack off the sail a trifle' (Gladwin 1964: 171–2). Quite unlike the European navigator, with his charts and compass, the Micronesian seafarer feels his way towards his destination by continually adjusting his movements in relation to the *flow* of waves, wind, current and stars.[6] In this respect his activity does not differ in principle

from that of the terrestrial traveller who responds to the flow of perspective structure as he journeys through a landscape. Both are essentially engaged in projects of wayfinding rather than navigation: thus Hallowell's observation that for the Saulteaux, direction always has the meaning of 'toward such-and-such a place', is paralleled by Gladwin's that the Micronesian mariner proceeds as if he were constantly within sight of land (Hallowell 1955: 190–1, Gladwin 1964: 173). And once it is recognised that the wayfinder's multi-sensory monitoring is of flows, not images, and that flows specify paths and not spatial locations, Gell's objections to the idea of mapless practical mastery fall away.

Micronesian seafaring resembles terrestrial wayfinding in one other critical respect: every journey is apprehended and remembered as a movement through time rather than across space. Islands, for the mariner, are not pinned down to specific spatial or geographic locations, nor does he imagine his craft to be covering the distance over a planar surface from one such location to another. Throughout the voyage he remains, apparently stationary, at the centre of a world that stretches around as far as the horizon, with the great dome of the heavens above. But as the journey proceeds the island of embarkation slips ever farther astern while the destination island draws ever closer. At the same time an island off to one side, selected as a point of reference for the voyage, is supposed to swing past the boat, falling as it does so under the rising or setting positions of a series of stars. The fact that the reference island (*etak*) is normally invisible below the horizon, and may not even exist at all, has been a source of puzzlement to many interpreters who – assuming that the mariner's task is to navigate from one spatial location to another – have proposed that the *etak* is used to obtain a locational fix. Nothing in what the mariners themselves have to say, however, suggests that it serves any such purpose. The alleged bearing of the *etak* does not enter into any numerical computation. Rather, pointing to the *etak* is the mariner's way of indicating where he is in terms of the temporal unfolding of the voyage as a whole (Hutchins 1995: 87–8). We have already seen how, in terrestrial wayfinding, a route from one place to another is remembered as a temporally ordered sequence of vistas. In much the same way, the Micronesian mariner remembers an inter-island voyage as a sequence of *etak* segments, each of which begins as the reference island falls under one particular star and ends as it falls under the next in line. At any movement, the mariner will know what segment he is in. As it swings beneath the horizon, from segment to segment, the *etak* island marks in its movement the passage of time, just as do the sun, moon and stars overhead, in theirs. Completion of the penultimate segment should bring the mariner, at length, to the final '*etak* of sighting', as the island for which he is bound hoves into view.

The world has no surface

One further contrast remains to be drawn between wayfinding and navigation, and it takes us back to the cartographic notion of the map as a representation of some portion of the earth's surface. The following 'official' definition of the map, issued by the International Cartographic Association, is exemplary:

> A map is a representation normally to scale and on a flat medium, of a selection of material or abstract features on, or in relation to, the surface of the Earth or of a celestial body.
>
> (cited in Robinson and Petchenik 1976: 17)

Now the idea that the world is presented to the traveller as a surface to be traversed presupposes the specialised, 'bird's-eye view' of the cartographer or navigator. Indeed the world can only be perceived to have an exterior surface by a mind that is situated above and beyond it. In ordinary wayfinding however, whether on land or at sea, the world is apprehended from within. One makes one's way *through* it, not over or across it. Of course the traveller encounters surfaces of diverse kinds – of solid ground, water, vegetation, buildings, and so on – and it is largely thanks to the responses of these surfaces to light, sound and the pressure of touch that he perceives the environment in the way he does. For the mariner the ocean, with its subtle differences of tint and colour, sculpted by the wind into waves and ripples, and breaking up around the boat into foam and spray, presents an infinitely variegated and ever changing surface. Likewise for the pedestrian, making his way along a forest track, the surface of the ground is a patchwork of mud, furrowed by the imprint of previous journeys, puddles, fallen leaves, broken boughs, and outcropping rocks and stones. These are surfaces, however, *in* the world, not *of* the world. That is to say, they are formed on the interface, not between matter and mind, but between solid or liquid substance and the gaseous medium (air) in which humans live and breathe, and which affords movement and sensory perception.[7] In short for its manifold inhabitants, journeying along their respective ways of life, the world itself *has no surface*.

I noted earlier the parallel between the tracing of paths on the ground in wayfinding and the tracing of lines on paper (or in sand, snow, etc.) in mapping: indeed to the extent that all wayfinding is mapping, these are one and the same. Our conclusion, however, that for the mapper or wayfinder the world has no surface, calls for some qualification of the view, for which I argued above, that mapping is an inscriptive process. This need not be so. If a map consists of a network of interconnected lines, each corresponding to a path of movement through the world, there is no necessary reason why these lines should be inscribed on a surface. One could think of the gesturing hand, in mapping, as a weaving hand rather than a drawing hand, and of the result as something more akin to a cat's cradle than a graph. The lines of the map could be threads, wires or sticks. Micronesian mariners used coconut leaf ribs to map the intersecting courses of ocean swells (Turnbull 1991: 24). Or to take a familiar example from a contemporary urban context, one could construct a route map for the London Underground out of stiff wire, soldered at the intersections, and it would serve just as well as the conventional printed versions. The fact that the map is generally reproduced on paper is a matter of obvious practical convenience, but not of logical necessity. The meaning of the map lies entirely in its routes and intersections, whereas the paper surface has no significance whatsoever. To read the map is to trace a continuous path from one station to another, without regard to their respective locations on the surface. With the modern topographic map it is quite otherwise, for in this case the paper surface of the map stands for nothing less than the *surface of the earth*. One of the most revealing indicators of this change in the significance of the map-surface, corresponding to the transition from mapping to mapmaking, lies in the appearance of frame boundaries. Native maps, as Belyea points out (1996: 6), are never framed. A line or border drawn around and enclosing such a map would have no meaning. The frame of the topographic map, by contrast, defines the portion of the earth's surface that the map purports to represent. Thus the appearance of borders around the map corresponds to the disappearance of the itineraries and practices that give rise to it.

CONCLUSION

There is a paradox at the heart of modern cartography. The more it aims to furnish a precise and comprehensive representation of reality, the less true to life this representation appears. 'To present a useful and truthful picture', as Mark Monmonier writes, 'an accurate map must tell white lies' (Monmonier 1991: 1). But the reason for the discrepancy between truth and accuracy is not quite what Monmonier claims it to be. It is not that the map must leave things out if critical information is not to be drowned in a welter of ever finer particulars. It is rather that the world of our experience is a world suspended in movement, that is continually coming into being as we – through our own movement – contribute to its formation. In the cartographic world, by contrast, all is still and silent. There is neither sunlight nor moonlight; there are no variations of light or shade, no clouds, no shadows or reflections. The wind does not blow, neither disturbing the trees nor whipping water into waves. No birds fly in the sky, or sing in the woods; forests and pastures are devoid of animal life; houses and streets are empty of people and traffic. To dismiss all this – to suggest that what is excluded in the cartographic reduction amounts, in Monmonier's words, to a 'fog of detail' – is perverse, to say the least (Wood 1992: 76). For it is no less than the stuff of life itself. Were one magically transported into the looking-glass world behind the map, one would indeed feel lost and disoriented, as in a fog. But the fogginess is a function not of the amount or density of detail but of the arrestation of movement. Detached from the flow of which each is but a moment, details settle like an opaque precipitate upon the surface of the earth. Little wonder, then, that the cartographer feels the need to sweep them up, or that the navigator prefers to brush them aside in plotting a course!

The ordinary wayfinder, on the other hand, is not generally troubled by detail. Quite to the contrary, the richer and more varied the texture of the environment, the easier it is to find one's way about. But above all, wayfinding depends upon the attunement of the traveller's movements in response to the movements, in his or her surroundings, of other people, animals, the wind, celestial bodies, and so on. Where nothing moves there is nothing to which one can respond: at such times – as before a storm, or during an eclipse – the experienced traveller can lose his bearings even in familiar terrain. These observations should finally lay to rest the cartographic illusion, namely that the world is pre-prepared as a stage upon which living things propel themselves about, from one location to another. Life, in this view, is an internal property of objects, transported upon the exterior surface of a lifeless earth. In the view I have set forth here, by contrast, the world is *not* ready-made for life to occupy. Contrary to the assumptions of cartographers and cognitive map theorists, life is not contained within things, nor is it transported about. It is rather laid down along paths of movement, of action and perception. Every living being, accordingly, grows and reaches out into the environment along the sum of its paths. To find one's way is to advance along a line of growth, in a world which is never quite the same from one moment to the next, and whose future configuration can never be fully known. Ways of life are not therefore determined in advance, as routes to be followed, but have continually to be worked out anew. And these ways, far from being inscribed upon the surface of an inanimate world, are the very threads from which the living world is woven.

Chapter Fourteen

Stop, look and listen!

Vision, hearing and human movement

On hearing sounds, and seeing things

Near the house where I grew up was a path I often took, which crossed a railway line. Beside the track was a notice which advised the pedestrian to 'stop, look and listen' before attempting to cross the line. I may not always have followed this advice as closely as I should, but at least I knew what it meant. To me, as doubtless to others who walked that path, it made perfectly good sense. In the absence of automatic signalling arrangements, how else is one to know whether a train is coming save by looking and listening? Only later did I discover that what is obvious to pedestrians is, to philosophers, utterly baffling. To be sure, the philosopher might admit, our knowledge of the world can only come through some form of perception. Yet it seems that the one thing we cannot perceive is perception itself. You may claim to see a train, but only by way of the light that reaches your eyes. And you hear it only by way of the sound that reaches your ears. So how can you know that the train exists at a certain distance, as a detached material object, behind the perceptual images, shaped in light and sound, that you have of it? And if it exists only in your perception – in your eyes and ears, or even in your thoughts – then how can it run you down? Nor is that all. Looking and listening, we receive one set of sensations through the eyes, and another, quite different set through the ears. Supposing that our knowledge is ultimately founded on sensory experience, how do we know that the sights and sounds that come to our notice are all manifestations of the same thing, the train, that is bearing down on us? If we hear sounds rather than things (like trains), then how do I know that *this* sound I hear belongs to *that* train I see?

   These are among the most ancient of philosophical conundrums, and it is not my intention to resolve them here. I do mean to suggest, however, that the way in which they are posed bears the imprint of a certain way of imagining the human subject – namely, as a seat of awareness, bounded by the skin, and set over against the world – that is deeply sedimented in the Western tradition of thought. The problem of perception, thus, is one of how anything can be translated or 'cross over' from the outside to the inside, from the macrocosm of the world to the microcosm of the mind. This is why visual and aural perception are usually described, in the writings of philosophers and psychologists, as processes of *seeing* and *hearing*. Sight begins at the point where light enters the eyes of the stationary perceiver, hearing at the point where sound strikes his ears – at the interface, in short, between outside and inside. Yet the notice beside the railway tracks did not advise the pedestrian to 'stand, see and hear'. It advised him to 'stop, look and listen': that is, to interrupt one bodily activity, of walking, and to initiate another, of looking-and-listening (as I show later, these are better regarded as aspects of one activity than as two distinct

activities). In what, then, does this activity consist? Not in opening the eyes, since these are open anyway; nor in opening the ears, since they cannot be closed save by stopping them with the fingers. It consists, rather, in a kind of scanning movement, accomplished by the whole body – albeit from a fixed location – and which both seeks out, and responds to, modulations or inflections in the environment to which it is attuned. As such, perception is not an 'inside-the head' operation, performed upon the raw material of sensation, but takes place in circuits that cross-cut the boundaries between brain, body and world.

But I am running ahead of myself. There is much ground to be cleared before the idea of perception outlined above can be substantiated. To begin this clearance we need to inquire more closely into the assumptions we tend to make about our experiences of seeing and hearing. You can attempt to find out what these are by performing a simple thought experiment. Suppose you are standing beside the tracks as a train is passing. You see the locomotive and the coaches hurtling by, you hear the roar of the engine followed by the clickety-clack of bogies as they roll over joints in the rail. These sights and sounds are ordinarily so entangled in your experience that it is not easy to tell them apart, to imagine what the train would look like without the noise it makes, or what it would sound like without the appearance it presents. But you could try, nevertheless. Picture yourself blindfolded, or on a pitch dark night, such that the visual component of experi-ence is eliminated. The sound of the approaching train, as it swells, seems to assault and ultimately to overwhelm every fibre of your being. You cannot resist being swept along with it until eventually, as the train recedes into the distance, you are left stranded by the trackside, breathless and dizzy, in exactly the same spot where, in truth, you had been standing all along! But now, as a second experiment, picture yourself with your ears stopped, so as to cut out the auditory component of experience. This time the train appears to pass before your eyes as though it were a spectre whose very existence lies in dimensions other than those of the world to which you belong. You see it, you register its presence and its passing, but you are not *moved* by it. The vision is just another sighting to add to your collection.

If the results of these admittedly fictitious experiments have any validity, they suggest that far from being equivalent and mutually substitutable, vision and hearing are radically opposed, as different as is standing on the river bank, watching the water flow by, from being tossed in with the current. As a participant observer in the event constituted by the train's passing the spot where you stand, at the intersection of the path and the tracks, it would seem that whereas you participate aurally, you observe visually. Indeed the notion that sound can get inside you and shake you up, in a way that light cannot, has a long and distinguished pedigree in the history of ideas. Time and again, the ears are imagined topologically as openings in the head that actually allow the sound to seep in and touch the innermost surfaces of being. The eyes, by contrast, are supposed to be backed by screens that let no light through, leaving the mind in the dark – like the inhabitants, in Plato's celebrated allegory, of a cave who can see nothing but shadows on the walls cast by the light of their own fire. Sound, it is said, reaches directly into the soul, whereas in vision all one can do is reconstruct a picture of what the outside world might be like, on the basis of light-induced sensations. But by the same token, we are more readily convinced that we hear sound than that we see light. The objects of vision, we suppose, are not sources or manifestations of light but the *things* that light illuminates for us. The objects of hearing, on the other hand, are not things but sounds or sources of sound.[1]

True, there have been dissenting voices. One of them was Martin Heidegger. In his essay on 'The origin of the work of art', Heidegger argued that only when we divert our

attention away from things, or listen abstractly (as we might, say, to classical music, with our eyes closed), do we hear 'bare sound'. In ordinary life, he insisted, we do not hear sounds but things themselves – the door shutting in the house, the storm in the chimney, the Mercedes as distinct from the Volkswagen (Heidegger 1971: 26). So too, Heidegger would have said, we hear the train before the noise it makes. But this view is not easily reconciled with everyday experience. For what we claim to hear, at least when we speak of these matters, is the slamming of the door, the whistling of the wind, the humming or chugging of the car engine, and the roar of the locomotive. Slamming, whistling, humming, and so on are words that describe not things but actions or movements which, because of the vibrations they set up, we actually sense as noises of various kinds. Or to take another example, consider the word 'cuckoo'. This is, in the first place, an onomatopoeic rendering of a sound that I have often heard in the countryside, and which always seems to emanate from a far-off, undisclosed location in the woods. We say the cuckoo is a bird, but in my experience the bird exists, purely and simply, as its sound. I have never seen one (except in illustrated books on ornithology). But only through being seen does the cuckoo come to be apprehended as a thing that makes a sound, instead of the sound itself.[2]

In due course I shall proceed to qualify the idea that we see things before light, and hear sound before things. I shall do so by showing that sound, strictly speaking, is no more an object of hearing than is light an object of vision. Rather, just as to say there is light is another way of saying that one can see, so also, to say there is sound is another way of saying that one can hear. Light and sound are, in essence, the undersides of the experiences of seeing and hearing respectively. Now as blind people are able to tell us, it is in fact possible to hear things as well as to see them. And for sighted people, the eyes are as much a part of the perceptual system for listening as are the ears part of the system for looking. To that extent, vision and hearing are not so much disparate as interchangeable. But behind the discovery, whether visual or auditory, of a world already made there lies a deeper, pre-objective level of perception, a level at which sensory awareness rides on the cusp of the very movement of the world's coming-into-being. At this level, as I shall show, the experiences of vision and hearing are not mutually substitutable in the way that – for example – the signed language of the deaf is substitutable for oral speech. Instead, they are virtually indistinguishable: vision *is* a kind of hearing, and vice versa. This argument eventually leads me to reject the thesis that attributes the dominance of objective thinking in the West to an obsession with the eye. For the moment, however, let me continue with the contrast between seeing and hearing, as this is commonly understood, in order to examine its implications for our understanding, first, of persons and things; secondly, of language, speech and writing; and thirdly, of the sensory practices of people in non-Western societies.

Vision objectifies, sound personifies

Of all the implications of the contrast between vision and hearing, the most consequential has been the notion that vision, since it is untainted by the subjective experience of light, yields a knowledge of the outside world that is rational, detached, analytical and atomistic. Hearing, on the other hand, since it rests on the immediate experience of sound, is said to draw the world into the perceiver, yielding a kind of knowledge that is intuitive, engaged, synthetic and holistic. For those who would celebrate positive scientific inquiry as the crowning achievement of the human spirit, vision is undoubtedly the

superior sense. Yet for all that, it is not to be trusted. The visual path to objective truth, it seems, is paved with illusions. Precisely because vision yields a knowledge that is indirect, based on conjecture from the limited data available in the light, it can never be more than provisional, open to further testing and the possibility of empirical refutation.[3] But while we can never be certain of what we see, there is no doubt about what we hear. Since sound speaks to us directly, hearing does not lie. We do not suffer from aural as we do from optical illusions (Rée 1999: 46). In short, when it comes to affairs of the soul, of emotion and feeling, or of the 'inwardness' of life, hearing surpasses seeing as understanding goes beyond knowledge, and as faith transcends reason.

Nothing better illustrates these attitudes to vision and hearing, so deeply embedded in Western sensibilities, than these lines from the 'Foreword' to Victor Zuckerkandl's classic study of musical perception, *Sound and Symbol*. Here he is comparing the demeanour of the blind and the deaf:

> The quietness, the equanimity, the trust, one might almost say the piety, so often found in the blind are in strange contrast to the irritability and suspicion encountered among so many of the deaf . . . It seems as if, by the very fact that the blind man trusts himself to the guidance of the ear instead of the eye, other modes of connection with the world are revealed to him, modes that are otherwise overshadowed by the dominance of the eye – as if, in the realms with which he thus comes into contact, man were less alone, better provided for, more at home, than in the world of visible things to which the deaf man is directed and to which an element of foreignness always clings.
>
> (1956: 3)

As a stereotypic depiction of the behaviour of blind and deaf people this passage is, of course, outrageous. It says much, however, about how we are inclined to view hearing as warm, connecting and sympathetic; and sight as cold, distancing and unfeeling. No wonder, then, that numerous commentators have sought to lay the ills of modern Western civilisation at the door of its alleged obsession with vision (Jay 1993a, Levin 1988, 1993). More than any other modality of perception, they say, vision leads us to objectify our environment, to regard it as a repository of things, alien to our subjective selves, that are there to be seized by the eyes, analysed by science, exploited by technology, and dominated by power. If only we could redress the balance by restoring hearing to its proper place in the sensorium, it is claimed, we might hope to regain a more harmonious, benevolent and empathetic awareness of our surroundings. Then, perhaps, we may rediscover what it means to *belong*.[4]

These laments are not new; to the contrary, the denigration of vision is as ancient as is its elevation to the top of the hierarchy of the senses. As Don Ihde points out, in his study of the phenomenology of sound, 'there is an old and deeply held tradition that vision "objectifies", and, contrarily but not so widely noted, there is a tradition which holds that sound "personifies"' (Ihde 1976: 21). To this latter tradition belong the claims of many classical scholars that the very word, 'person', is derived from the Latin verb *personare*, meaning literally 'to sound through'. Whether the derivation is etymologically well founded need not concern us;[5] what count are rather the reasons that make it so compelling. These, I contend, lie in its concordance with a widely held notion that behind the visible aspect of the person, above all the face, lies an inner being that reveals itself through the voice. In speaking, the voice 'sounds through' from the inside to the outside; in hearing it conversely penetrates from the outside to the inside. Where vision places us

vis-à-vis one another, 'face-to-face', leaving each of us to construct an inner representation of the other's mental state on the basis of our observations of outward appearance, voice and hearing establish the possibility of genuine intersubjectivity, of a participatory communion of self and other through shared immersion in the stream of sound. Vision, in this conception, defines the self individually in *opposition* to others; hearing defines the self socially in *relation* to others.

THE WRITTEN WORD AND THE SOUNDS OF SPEECH

Nowhere is the ambivalence surrounding attitudes to vision and hearing more evident than in Western ideas about language, and above all about the distinction between speech and writing. The distrust of writing is a recurrent theme throughout the history of Western thought. Ever since Plato and Aristotle, philosophers have tended to regard writing as an exterior, visible facade for the inner sonic reality of spoken words. Plato, in the *Phaedrus* (274–7), has Socrates declare that writing provides no more than 'the appearance and not the reality of wisdom' (Plato 1973). For Aristotle, only the spoken word truly represents mental experience, while the written word stands for the spoken one (Aristotle 1938: 115). Rousseau, for whom writing was 'nothing but the representation of speech', complained bitterly (in writing of course) about the prestige and attention accorded by his contemporaries to writing when it was no more than a contrived and inauthentic cover for the real thing (Derrida 1974: 36). And two of the giants of twentieth-century linguistics held to much the same opinion. For Bloomfield (1933: 21) writing was 'merely a way of recording language by visible marks', while according to Saussure (1959: 23), 'language and writing are two distinct systems of signs; the second exists for the sole purpose of representing the first'. In a famous image (Figure 14.1), Saussure located language at the interface between thought and sound, as though human consciousness – the realm of ideas – hovered over an ocean of sound like air over water (1959: 112).

There is, in all these pronouncements, an implicit prioritisation of hearing over vision, as though the former gave access to intimacies of human experience to which the latter could only offer a pale reflection. 'The only true bond', as Saussure wrote, is 'the bond of sound' (1959: 25).[6] Ironically, however, at the very same time that writing is rendered as having no other purpose than the modelling of speech in a visible medium, the apprehension of speech is itself modelled on the inspection of the written word. Thus a visual bias
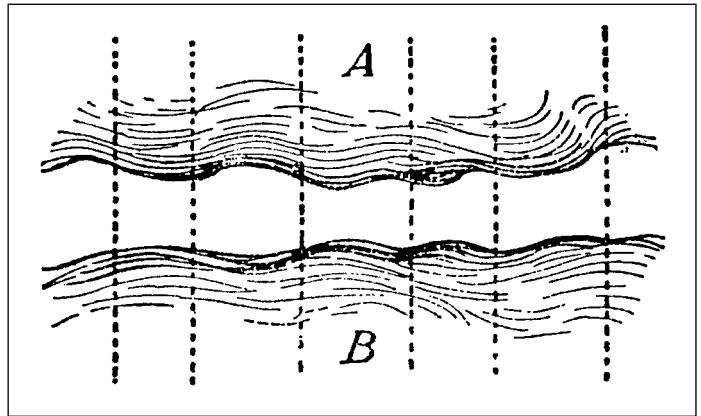
Figure 14.1 Saussure's depiction of language at the interface between a plane of thought (A) and a plane of sound (B). The role of language is to cut the interface into subdivisions, as indicated by the vertical dashed lines, thereby establishing a series of relations between particular ideas and particular sounds. 'Visualize the air in contact with a sheet of water', says Saussure; 'if the atmospheric pressure changes, the surface of the water will be broken up into a series of divisions, waves; the waves resemble the union of thought with phonic substance'.

From F. de Saussure, *Course in general linguistics*, New York: The Philosophical Library, 1959, p. 112.

enters, as it were by the back door, into our very notion of what language *is*. Recall that the underlying assumption, shared by both champions of visual perception and their critics, is that we do not see light but the objects it illuminates. You may not be able to read, for example, without a source of illumination, but what you see is not the light but the words on the page. Likewise, you cannot hear speech unless it is voiced in sound. However your familiarity with the written word leads you to believe that what you hear is not the sound itself but the words shaped in it. 'Language-as-word', as Ihde notes, 'even while sounding, does not draw attention to itself *as* sound' (1976: 161). Rather, the sound 'yields up' or delivers the words we claim to hear. Thus it is supposed that words can be extracted from the medium of sound, and can be preserved, whether as impressions in the mind or as inscriptions on the page, independently of their sounding.

Language, it seems, is the exception that proves the rule that we see things (not light), and hear sounds (not things). When we listen to music, we attend to the sound *as such*, for it is surely in the sound, no more and no less, that the music consists. But when it comes to speech, we are inclined to treat hearing as a species of vision – a kind of seeing with the ear, or 'earsight' – that reacts to sound in the same way that eyesight reacts to light. Thus we are convinced that we apprehend words, not sound. It is almost as though the sounds of speech were seen rather than heard. This, of course, is exactly what Saussure had in mind when he described the verbal signifier – the pattern of sound as registered in the psyche – as a *sound-image* (1959: 66). So far as he was concerned, we recognise a word of speech in the same way that we do a word of writing, by matching the perceived pattern to a pre-existing mental schema. But what if we had never seen a word, if we had no notion of a word as an object of vision? Granted that our familiarity with writing leads us to model the hearing of the spoken word upon the sight of the written one, how might the power of speech have been experienced by people with no knowledge of writing, or for whom the written word was meant to be disseminated, at most, through being read aloud rather than through its reproduction in print?

In his influential study, *The Gutenberg Galaxy*, Marshall McLuhan (1962) argued that the invention of the printing press ushered in an entirely new era in the history of human culture, marked by the absolute dominance of the eye, and with it a bias towards a way of thinking that is objective and analytic, and that follows a linear path of explicit logical connections. Even before the introduction of print technology, during the preceding 'chiro-graphic' stage of culture, the substitution of written for spoken words had begun to tip the balance between sight and hearing in favour of the former. But among peoples at an 'oral-aural' level of culture, to whom writing was unknown, the ear exercised an over-whelming tyranny over the eye (McLuhan 1962: 28). And so too, McLuhan maintained, their thought lacked the logical elaboration, analytic discrimination and objectivity that, in the literate West, are normally considered to be the hallmarks of rationality. Building on these ideas, one of McLuhan's associates, Walter Ong, sought to derive all the essential characteristics of 'orally based thought and expression' from the features that distinguish hearing from vision. Oral culture, he claimed, is aggregating, harmonic and holistic rather than dissecting, analytic and atomistic; concrete and situationally specific rather than abstract and context-independent; and focused on persons rather than things. Hearing binds people together in community; vision isolates the individual *vis-à-vis* the world. Finally, 'the interiorizing force of the oral word relates in a special way to the sacral, to the ultimate concerns of existence'. With the ascendancy of vision, however, religion gives way to secular science (Ong 1982: 73–4).

In their placing of oral cultures and literate civilisations on either side of a 'great divide', both McLuhan and Ong effectively reproduced a dichotomy between oral participation and visual observation that, as I have already shown, is deeply embedded within the Western tradition. Thus sound, according to Ong, registers the interiority of things in a way that is impossible with light, which merely reflects off their outer surfaces. The following passage is exemplary:

> Sight isolates, sound incorporates. Whereas sight situates the observer outside what he views, at a distance, sound pours into the hearer . . . Vision comes to a human being from one direction at a time . . . When I hear, however, I gather sound from every direction at once: I am at the center of my auditory world, which envelops me, establishing me at a kind of core of sensation and existence . . . You can immerse yourself in hearing, in sound. There is no way to immerse yourself similarly in sight.
>
> (Ong 1982: 72)

It is in his contention that the listener in a 'primarily oral' culture hears words *as sound*, rather than as images shaped in sound, that Ong takes issue with Saussure (1982: 17). People in such a culture, 'totally untouched by any knowledge of writing or print', do not hear words as if they were looking at them. In their speech, every word is a fugitive movement carried on the crest of a sound that 'exists only when it is going out of existence'. It was writing, Ong contends, that tied words down and made them appear thing-like, as 'quiescent objects . . . for assimilation by vision' (1982: 91). Thus writing transforms the word rather than, as Saussure thought, merely representing it in an alternative medium.

Vision and hearing in anthropology

Another of McLuhan's collaborators was the anthropologist Edmund Carpenter. Writing on the basis of fieldwork conducted among the Aivilik Eskimo (Inuit) of Southampton Island in the Canadian arctic, Carpenter claimed that the world of the Inuit is defined, above all, by sound rather than by sight (Carpenter 1973: 33). To inhabit such a world is not to look out upon a space of ready-made objects, but to participate from the inside in the perpetual movement of their generation. There are, strictly speaking, no things in the Inuit world, only beings, which establish their presence, first and foremost, by way of their ongoing actions. Hearing is the resonant coupling of these actions with the movement of the listener's attention. Thus Inuit hear sound rather than things, and are moved by the sound itself, as they are by song. Indeed the distinction between speech and song, so central to the literate conception of language, would make no sense to them (Carpenter 1966: 212; I return to this distinction in Chapter Twenty-three, pp. 407–10). Speaking and singing are actions which, like hunting or carving, 'bring out' or release aspects of being into the fullness of the acoustic space surrounding the person. Unlike the framed, pictorial space surveyed by the eye, acoustic space is 'dynamic, always in flux, creating its own dimensions moment by moment' (1973: 35, see also Carpenter and McLuhan 1960). Its form – as we recall from Chapter Twelve (pp. 210–11) – is that of a sphere, extending outwards from the person equally in all directions. But this sphere has no outer surface or boundary: it does not pre-exist and enclose the speaker and listener but rather takes shape around them in the very process of their auditory engagement with one another and with the environment.

Between them, McLuhan, Carpenter and Ong effectively laid the foundations for a currently vibrant field of inquiry that has come to be known as the anthropology of the senses (Stoller 1989, Howes 1991a, Classen 1993, 1997). It is true that certain aspects of their programme have come in for justified criticism from anthropological quarters: the attribution of pre-logical mentalities to 'tribal' societies at the oral-aural level, the relative neglect of other sensory modalities besides sight and hearing, and the consequent elision of differences among cultures on either side of the 'great divide' between orality and literacy (Howes 1991b: 172–3, Classen 1997: 403–4). However the basic idea, that cultures can be compared in terms of the relative weighting of the senses through which people perceive the world around them, has been retained. Thus it is not so much in *what* they perceive as in *how* they perceive that cultures differ. It will no longer do to identify cultural variations with alternative worldviews, as though everyone perceived their surroundings in the same way (visually, by viewing it) but saw different things on account of their drawing on different models for organising the data of perception into representations. For the very idea that the world is known by representing it in the mind is bound up with assumptions about the pre-eminence of vision that are not applicable cross-culturally. Below I briefly review three studies in the anthropology of the senses, all of which accord particular prominence to hearing. The first, by Paul Stoller, is of the Songhay of Niger, in West Africa; the second, by Anthony Seeger, is of the Suyá of Mato Grosso, Brazil; and the third, by Alfred Gell, is of the Umeda of Papua New Guinea.

For the Songhay, Stoller asserts, sound 'is a foundation of experience'. Unlike vision, which sets up a distance between the spectator and the object seen, sound 'penetrates the individual and creates a sense of communication and participation' (1989: 103, 120). To show how this is so, Stoller examines the significance that Songhay attach to the sounds of two kinds of musical instruments – the *godji* (monochord violin) and *gasi* (gourd drum) – both played during possession ceremonies, of the praise-poetry that accompanies these ceremonies, and of words spoken in sorcery. The *godji* produces a high-pitched cry, whereas the *gasi*, depending on how it is beaten, produces a 'clack' or a 'roll'. Both people and spirits are excited by these sounds, finding them irresistible. Indeed for the Songhay, the cries of the violin, and the clacks and rolls of the drum, *are* the voices of spirits that, in rituals of possession, penetrate and shake up the bodies of those possessed. And while the instruments are sounding, the praise-singer (*sorko*) recites the names of the spirits, shouting them directly into the ears of the intended medium. The sonic force of the shout affects the medium's body much as wind affects fire, igniting it into paroxysms that indicate the onset of possession (Stoller 1989: 108–12). In sorcery, too, it is the actual sound of the magical incantation that powerfully works its effects, whether for good or ill, on the body of the victim or patient. The magical word *is* sound, which exists (and goes out of existence) in the act of its enunciation. As such, it is a phenomenon of the same order as the cry, clack or roll of the musical instrument, or the shout of the praise-singer. In every case it is the sound itself that people hear, and to which they respond. This sound is supposed to have an existence of its own, 'separate from the domains of human, animal and plant life' (1989: 112).

Among the Suyá, according to Seeger, the faculty of hearing is valued very highly, as are the complementary faculties of speech and song. Speech is distinguished from song in Suyá classification, not however in terms of the detachment of words from sound, but as poles on a continuum of alternative combinations of 'phonetics, text, time, tone and timbre' (Seeger 1987: 46, 51). The significance accorded to hearing, as well as to speech and song, is highlighted through the massive expansion of the earlobes and (for men) the

lower lips, into which are inserted large discs of wood or rolled palm leaf. The word *ku-mba*, in the Suyá language, translates not only as 'to hear' but also as 'to understand' and 'to know'. It is the ability to 'hear-understand-know' well that defines the person as a fully social being. And where we might describe the memory even of spoken words in visual terms, as images in the mind, Suyá describe even a visual phenomenon such as a weaving pattern, that has been learned and remembered, as lodged in the ear (Seeger 1975: 213–14). The sense of sight, to the contrary, is associated in Suyá thinking with morally delinquent, anti-social tendencies. A person possessed of extraordinary powers of hearing is a paragon of virtue, but someone with extraordinary vision is a witch. The witch sees everything – his is a transparent world that offers no barriers to sight. 'He can look up and see the village of the dead in the sky; he can look down and see the fires of the people who live under the earth; and he can look around and see enemy Indians in their own villages far away' (1975: 216). In their elaboration of hearing as the morally superior sense, and their distrust and fear of people with vision, Suyá seem to establish 'some kind of opposition between vision and social virtue' which, Seeger suggests, may have resonances elsewhere – even in the traditions of the West (1975: 222).

The Umeda, like many other peoples of Papua New Guinea, inhabit an environment of dense, and virtually unbroken forest, in which things are visible only at close range, normally within a few tens of metres. Such an environment, Gell argues, 'imposes a reorganisation of sensibility', giving pride of place to hearing, along with smell (Gell 1995: 235). Thus out hunting, Umeda walk with their eyes to the ground, listening for game instead of looking for it, since it is by their sounds that animals announce their existence and presence in the world of the hunter. This is not a world of preconstituted, visual-spatial objects but is rather apprehended dynamically. Not only animals and plants, but also landscape features such as ridges, knolls and pools, are grasped in the first place as movements rather than static forms. Alert to these movements, the body resonates rather like a sounding cavity, and responds in kind through its own activity of speech (1995: 240). Thus the sound of the spoken word echoes to the movement of the being or feature in the environment to which it corresponds, giving rise to the 'phonological iconism' which, as Gell shows, is such a pronounced feature of the Umeda language. Through their speech, Umeda do not point to and label things in the world 'out there', but continually bring the world into being around themselves, even as they are continually brought into being through their own immersion in an ambience of sound. But Gell goes further, to propose that the predominance of hearing over seeing leads to a 'bias towards the expression of sympathy towards community members' (1995: 235). The 'auditory' culture of the Umeda, Gell claims, is a 'culture of sympathy'.

THE ANTHROPOLOGY OF THE SENSES: A FIRST CRITIQUE

What is so striking about the studies reviewed above is that in all three, a radical contrast is established between hearing and vision along lines which, as we have seen, are already sharply drawn within the Western tradition. Among the criteria of distinction, to recapitulate, are that sound penetrates whereas sight isolates, that what we hear are sounds that fill the space around us whereas what we see are things abstracted or 'cut out' from the space before us, that the body responds to sound like a resonant cavity and to light like a reflecting screen, that the auditory world is dynamic and the visual world static, that to hear is to participate whereas to see is to observe from a distance, that hearing is social whereas vision is asocial or individual, that hearing is morally virtuous whereas vision

is intrinsically untrustworthy, and finally that hearing is sympathetic whereas vision is indifferent or even treacherous. Yet there are puzzles and inconsistencies which suggest that these distinctions may reflect more upon the preconceptions of anthropological analysts than upon the actual sensory experience of the peoples among whom they have worked. Indeed it is hard to avoid the suspicion, voiced by Nadia Seremetakis (1994: 124), that in the imputation to non-Western 'Others' of heightened auditory (along with tactile and olfactory) sensibilities, they are being made to carry the burden of sensory modalities exiled from the sensory structure of Western modernity on account of the latter's attribution to the hegemony of vision.

Stoller, for example, devotes a whole chapter to arguing the need for anthropologists to transform themselves from ethnographic 'spectators into seers',[7] by opening up to the world of the other and allowing themselves to be penetrated by it. So convinced is he, however, that 'a person's spatialized "gaze" creates distance' that he can follow his own advice only by learning to *hear*, rather than to see, as the Songhay do (1989: 120). In this, his approach is entirely in accord with the convention that to attain real knowledge one must abandon the illusions of vision and yield to the guidance of the ear. The true 'seer' of the Western tradition is the blind prophet: in Seeger's words, 'one who physically cannot see' (1975: 222). Yet by Seeger's own account, this is not so for the Suyá, among whom the witch is certainly a seer rather than a spectator, albeit of a morally undesirable complexion. For the witch's all-around sight does not view the world from the outside, but opens it up from the inside. A similar inconsistency between analytic preconception and native experience appears in Gell's study of the Umeda. For having reasserted the now familiar proposition that 'hearing is (relatively) *intimate*, concrete, and tactile, whereas vision promotes abstraction', he goes on to tell us that Umeda themselves 'treat sight . . . as a climactic sense with connotations of *intimacy* and danger' (1995: 235, 239, my emphases). The intimacy of sight, for Umeda, lies in close-range, eye-to-eye contact, and its danger is linked to the ever present possibility of sorcery attack. An angry glance can terrify the one to whom it is directed. Umeda, it seems, would be the last to agree that vision promotes abstraction!

Commenting on the Suyá case, David Howes suggests that 'there may be a connection between aurality and sociability, on the one hand, and visuality and individuality (or an "asocial disposition"), on the other'. This connection, he argues, might even be rephrased as a general law: 'the more a society emphasizes the eye, the less communal it will be; the more it emphasizes the ear, the less individualistic it will be' (Howes 1991b: 177–8). Once again, however, this 'law' merely reproduces a homology between two dualities, individual versus social and seeing versus hearing, that has long been axiomatic in the Western tradition. And it glosses over fundamental differences between Western and (for example) Suyá understandings, both of the 'asocial individual' and of vision. The Suyá 'witch' is not at all, as Howes (1991b: 177) thinks, the counterpart of the Western 'individual'. For one thing, the witch's vision penetrates the world rather than catching reflections off its outer surfaces; for another he does not stand, as does the Western individual, *vis-à-vis* others in society, but embodies in his being the active negation of sociality as a principle of relationship. In this sense the witch is more *anti*-social than *a*social.

Like the Suyá witch, the shaman among the Inuit possesses extraordinary powers of vision, though these could be used for beneficial as well as harmful ends. He, too, is a seer rather than a spectator, whose sight could open up pathways into the parallel worlds of animals and spirits. In the cosmology of the Yup'ik Eskimos, according to Anne Fienup-Riordan, 'vision was an act constituting knowledge, and witnessing was a potentially

creative act' (1994: 316). The Eskimo cosmos, it transpires, teems with ever-watchful eyes. Among Inuit generally, there is a close association between seeing and hunting: it is through his clear and penetrating sight that the hunter initiates an encounter with the game animal, which in turn is consummated with the animal's willingly offering itself to the hunter (Oosten 1992: 130). These observations bring us back to Carpenter's seminal study of Inuit sensory experience. Why, in the face of overwhelming evidence for the centrality of eyesight to the Inuit perception of their environment, did Carpenter nevertheless insist to the contrary that, for them, the eye is subservient to the ear (Carpenter 1973: 33)? Could it be because he took with him into his study a preconceived notion of vision, as analytic and reflective rather than active and generative (Schafer 1985: 96), that was fundamentally incompatible with his fine appreciation of the dynamic potential and spherical topology of the Inuit lifeworld? And if, as Inuit ethnography suggests, it is perfectly possible to combine the perception of a lifeworld of this kind with a thoroughgoing ocularcentrism, albeit of a kind radically different from that with which we are familiar in the West, then how can we any longer attribute such perception to the predominance of hearing over sight in the balance of the senses?

Recall that it is on precisely these grounds that Gell accounts for the Umeda perception of animals, plants and the landscape. Judging from the descriptions of Gell and Carpenter, the parallels between the ways in which Umeda and Inuit constitute their worlds of experience are remarkably close. Their respective environments, however, could hardly be more different: dense, tropical forest as against treeless, arctic tundra. It is scarcely surprising that in these conditions, the Umeda hunter should be obliged to rely on his ears, and the Inuit hunter on his superior eyesight. Indeed Carpenter admits that when his Inuit companions used their eyes, 'it was often with an acuity that amazed me' (1973: 36). Yet to the extent that he depends on powers of vision rather than hearing, the Inuit hunter does not, in consequence, find his relation with the world turned inside out. He remains, like his Umeda counterpart, at the centre of a dynamic cosmos, caught up in the process of its perpetual generation. Beings do not, all at once, appear to him inert and thinglike, nor does the hunter feel himself any more an observer, or any less a participant.

Thus in comparing the sensory profile of Inuit or Umeda – or for that matter, Songhay or Suyá – with that of the West, it is clear that what is at stake is not the priority of vision over hearing, but the understanding of vision itself. Evidently, the primacy of vision cannot be held to account for the objectification of the world. Rather the reverse; it is through its co-option in the service of a peculiarly modern project of objectification that vision has been reduced to a faculty of pure, disinterested reflection, whose role is merely to deliver up 'things' to a transcendent consciousness. But while the eye, as Theodor Adorno argued, has had to get used to perceiving a reality of objects (or more specifically, of commodities), the ear has lagged behind in this development. There is something almost 'archaic', says Adorno, about hearing (Adorno 1981: 99). One of the ironies of the contemporary critique of visualism is that in calling for the restoration of hearing to its rightful place in the ratio of the senses, it actually reproduces this opposition between hearing and vision, and with it the very narrow and impoverished concept of vision to which its enlistment in the project of modernity has brought us. Having installed vision as the chief instrument of objective knowledge, leaving hearing to float in the primordial realms of emotion and feeling, we know what it means to hear sound but have effectively lost touch with the experience of *light*. To show how this has come about, I turn in the next section to a figure whose thinking is widely acknowledged to occupy a pivotal place in this transition – René Descartes.

The Optics of Descartes

Descartes began his *Optics* of 1637 by proclaiming his enthusiasm for the telescope. 'Since sight', he wrote, 'is the noblest and most comprehensive of the senses, inventions which serve to increase its power are undoubtedly among the most useful there can be' (1988: 57). And what more wonderful invention could one imagine than the telescope, which has so enhanced the power of sight as to open up whole new vistas for the human understanding of nature and the universe? In according pride of place among the senses to vision, Descartes was following in the footsteps of a long line of philosophers, reaching back to Plato and Aristotle.[8] Despite continuing doubts concerning the reliability of sight, as opposed to hearing, the superiority of both vision and hearing over the so-called 'contact' senses of touch, taste and smell was never in question. So far, I have had nothing to say about the latter. Taste and smell raise a whole gamut of problems of their own which lie beyond my present concerns, and while I admit that they would have to be included in any discussion of human sensory experience that claimed to be truly comprehensive, I do not intend to deal with them further here. But I can no longer put off some consideration of touch. For in treatments of perception in the Western philosophical tradition, it is above all to touch rather than hearing that sight has been compared. And in this, Descartes was no exception. Indeed it was through an analogy with touch that he chose to introduce the workings of vision.

Descartes invites us to consider a man who, blind from birth, is well practised in the art of perceiving objects around and about him through the medium of a stick. What happens is this. When the tip of the stick impacts upon an object (whether due to the movement of the stick, the object or both), a mechanical impulse is passed to the hand, whence it is further registered in the region of the brain from which the nerves of the hand originate. These excitations in the brain then provide the data upon which is done a mental act of calculation. Suppose, for example, that the blind man wishes to judge the distance of an object, which he touches at the same point with two sticks, one held in each hand. Knowing the distance between his hands, and the angle formed by each stick with the line connecting them, it is a simple matter to work out how far the object lies from the body. As Descartes himself remarks, the mental computational task involved in the estimation of distance calls for 'a kind of reasoning quite similar to that used by surveyors when they measure inaccessible places by means of two different vantage points' (1988: 67).

The import of the analogy is that for Descartes, this is precisely equivalent to what happens in vision. All you have to do is to substitute rays of reflected light for sticks, and the two eyes for the two hands.[9] Fluctuations in the patterns of reflected light reaching the eyes, due to the movement either of environmental objects or of the eyes themselves, are registered at the back of the retina, and thence in the part of the brain where the optic nerve-fibres have their source. The mind – or what Descartes calls the soul (in French, *âme*) – then gets to work on these patterns of excitation, resulting in that awareness of objects that allows us to claim to 'see' them. In defence of Descartes, it is important to recognise two aspects of this account which are often overlooked. First, it was plain to him that perception – whether visual or tactile – depended on movement. Were there no movement of the body and its sensory organs relative to the environment, nothing would be perceived. Ironically, this point has been lost in much of the subsequent psychology of vision, only to be rediscovered by advocates of an ecological approach to visual perception who adopt an explicitly anti-Cartesian stance. I return to this below. Secondly,

Descartes did not, as is commonly supposed, argue that the function of the eyes is to establish internal representations of external objects, which are then available for inspection by the mind. Indeed he was well aware of the absurdity of having to posit another set of eyes, inside the brain, to view the internal image. Whatever reaches the brain, and leads us to have sensory awareness of objects, no more *resembles* those objects than do the movements of the blind man's stick resemble the objects with which it comes into contact (1988: 64).[10]

It remains the case, however, that for Descartes, the act of perception naturally divides into two stages: the first leading from the physical encounter with an object to a pattern of nervous excitation in the brain; the second leading from these nervous impulses to a mental awareness of the object in the perceiver's line of sight. In which of these two stages, then, does the essence of vision reside? The comparison with touch suggests the former. Thus vision uses eyes and light-rays, touch uses hands and sticks. At a critical juncture in his exposition, however, Descartes shifts his ground. For it transpires that it is no longer in the work of the eyes that the essence of vision lies, but rather in the operations of the mind upon the deliverances of the senses. 'It is the soul which sees', he declares, 'and not the eye; and it does not see directly, but only by means of the brain' (1988: 68). Initially introduced as an active mode of bodily exploration of the environment, vision – as it were – 'goes indoors', and perforce has to build a picture of the outside world on the basis of intelligence received via the nervous system. Nor need this intelligence be received exclusively by way of the eyes. As a purely cognitive faculty, vision can also work upon the data of touch. Equipped with a stick, or even with bare hands, the blind can see! So can sighted people, walking without a light on a pitch dark night (1988: 58).

Thus we reach the extraordinary conclusion that vision, now conceived as an exclusively intellectual achievement, is no longer conditioned in any way by the embodied experience of inhabiting an illuminated world.[11] The role of light, being precisely equivalent to that of the blind man's stick, is to effect a purely mechanical transduction. One does not see light, any more than the blind man sees his stick. Rather one sees things *by means of* the light and the stick. For what is registered in the brain, in the form of patterns of nervous excitation, is information not about light, or about the stick, but about the bodies in the environment with which it comes into contact, or off which it is deflected. Once this information is inside the brain, at the point where vision proper begins, the light – like the stick – has done its job, and plays no further part in the proceedings by virtue of which the perceiver comes to 'see' the world spread out before him. At this point the eyes, that look but cannot see, hand over to the 'I', the Cartesian *cogito*, who sees but cannot look. Through the medium of light, my eyes can touch the world, and be touched by it; but *I* cannot. Yet I can see. Evidently, then, the superiority of vision over touch is not that of one sense over another, but that of cognition over sensation. This is why Descartes chose to explain sight by making an example of the blind man. It was his way of showing that light, in itself, is incidental to vision.

ON THE MEANING OF LIGHT

All this, however, still leaves us with a puzzle. If the power of sight lies in the cognitive operations of the mind rather than the physical work of the eyes, then why should Descartes have been so excited by the telescope, which surely augments the power of the eyes but does nothing to assist the mind? It is the soul which sees, says Descartes. But the

telescope, which is not a computing device, does not help the soul to see! Were we to maintain, to the contrary, that the power of sight lies first and foremost in the work of the eyes and not the operations of the mind, then the telescope might indeed be of some assistance, yet by Descartes' own argument there would no longer be any reason to elevate the sense of sight over the contact sense of touch. If one could, with all equanimity, substitute sticks for light rays, then what is so special about eyesight? The ambivalence, in Descartes' account, between eye and mind as the primary locus of seeing, or in other words between vision as bodily *observation* and as mental *speculation* (Jay 1993a: 29), was never resolved, and remains with us to this day. Moreover it has become entangled in our thinking with another, equally puzzling dilemma, concerning the very significance of the word 'light'. Does it refer to rectilinear rays which, reflected off the surfaces of things, strike the eyes and thereby give rise to certain sensations? Or does its meaning lie in the subjective experience that we have in consequence of these sensations, of a luminosity within which things are given to consciousness as 'visible objects'? Does light, in short, shine in the world or in the mind?

For the philosophers of antiquity, this question did not arise, or not at least in this form. Their physics was one that placed the figure of sentient man at the centre of the cosmos, and each chapter of physics corresponded to a particular area of bodily sensation. One such chapter was optics. It was about how knowledge of the surrounding world could be obtained through the eye. Light, denoted by the term *lux*, was both the source of illumination and the medium in which this knowledge was supposed to be represented. As such it originated from the centre, with man, rather than from the cosmic periphery. But the Copernican revolution overthrew this anthropocentric cosmology. By the first half of the seventeenth century, when Descartes was writing, humankind had been relegated to the periphery of a universe that was supposed to run on principles entirely indifferent to human sensibilities. The task of physics was now to discover these principles. Among them are those whereby some physical impulse is propagated that, along with other effects, stimulates a reaction in the eyes. This impulse came to be known as *lumen*. Now when Descartes tells us that it is the soul that sees in the light of reason, rather than the eye in the light of the physical world, the light he is referring to is clearly the *lux* of the ancients – the light that shines in the mind.[12] But when to the contrary, as throughout the *Optics*, he speaks of light as reflected rays that excite the eye, he evidently intends to refer to the *lumen* of the physicists. The paradox of the *Optics* is that while vision 'goes indoors', from the world to the mind, light 'goes outdoors' from the mind to the world. And as Descartes showed, this external light – *lumen* – is the one thing we cannot see. The result is a curious disjunction between light and sight: the former on the outside, the latter on the inside, of an interface between mind and world. In short, sight begins where light ends.

Although more than three centuries have passed since Descartes was writing, we are still no clearer about the meaning of light. From contemporary physics we learn that light is a form of radiation that consists of waves or photons. This is to understand light in the sense of *lumen*. Yet most people, naturally enough, continue to equate light – as the thinkers of antiquity did – with the *lux* that illuminates the world of their perception. They are convinced, however, that this *lux* is the same as the physicists' *lumen*, and therefore that it has an external existence quite independent of their own eyes. Thus it is said that light travels from external objects to the eyes, and that we see because of it. And it is supposed that even if we close our eyes, the environment is still illuminated, as it was before. Yet we know that in fact, whatever reaches the eyes from outside (waves, photons)

gets no further than the back of the retina. And the experience on which we report, of an illuminated world, is apparently possible thanks to what goes on beyond that point, in the optic nerves and the brain. So is there light only in consequence of the stimulation of the retinal surface? Does it exist only on the hither side of eyesight? And if so, how can we claim, at one and the same time, that light *reaches* the eyes from afar? Physics has colluded in this confusion, though in the reverse direction. For notwithstanding its redefinition from a physiology of the senses to an objective science of nature, it continues to describe as 'optics' that branch of study dealing with light and its propagation, even though in practice it has nothing whatever to do with the eye.

Vasco Ronchi, in the introduction to his *Optics* of 1957, illustrates these problems in the conception of light by drawing an intriguing parallel with sound. The equivalent of the distinction between *lumen* and *lux* is, in this case, that between mechanical vibration in the external medium and the sound we claim to hear when our ears are placed within its field of action. By rights, there should be no such thing as a physics of sound. For as there is no sound without an ear and a brain, the study of sound – that is, acoustics – could be undertaken only by combining the physics of vibratory motion with the physiology of the ear and the psychology of aural perception. Yet physicists, anxious to reserve acoustics for themselves, and not to get mixed up with subjective phenomena of mind and perception, persist in equating the vibrations that induce in the listener an experience of sound with the sound itself, thus perpetuating the error that 'sound is actually a physical, not a mental phenomenon' (Ronchi 1957: 17). And so everyone else is happy to go along with the illusion that sound actually travels through the air and is received as such by the listener, when in fact all that reach the ears are vibrations and there is no sound until these have been transformed into nerve impulses and carried to the mind-brain.

But if there is really no sound in the physical world beyond the brain, are we to conclude that this world is *silent*? And likewise, if there is really no *lux* in the external world, are we to conclude that the world 'out there' is *dark*? This is, indeed, the conclusion to which Ronchi moves. Our minds are filled with sound and light, even though neither vibrations nor rays reach there, while the vibrant and radiant world is actually silent and dark. Yet what can silence mean in a world without ears, or darkness in a world without eyes? Questions about the meaning of light, as of sound, are surely wrongly posed if they force us to choose between regarding light and sound as either physical or mental phenomena. They are wrongly posed because they continue to regard the organs of sense as gateways between an external, physical world and an internal world of mind.

Thus Ronchi, like Descartes before him, thinks of vision as a process that starts with a movement in the world which, via a propagation of waves or particles that happen to enter the eyes, causes impulses to travel along the optic nerves to the brain, and ends with these impulses being 'turned over to the mind' which – on the basis of a comparison with information already in its possession – 'creates a luminous and colored figure' (Ronchi 1957: 288). According to this view, a physiology of vision can tell us about what happens on the far side of the 'turn-over' point, and a psychology of vision can tell us what happens on the near side. Neither kind of account, however, can embrace the 'turning over' itself. How it is that nervous impulses are passed to the mind – or how they 'tickle' the soul, as Descartes rather quaintly put it (1988: 65) – remains a mystery.

It is my contention that there is no such interface between eye and mind. Far from starting with incident radiation and finishing up with a mental image, the process of vision consists in a never-ending, two-way process of engagement between the perceiver and his

or her environment. This is what we mean when we speak of vision, colloquially, as 'looking' or 'watching'. And what Ronchi presents as a turn-over point is not that at all, but a critical nexus in this process. It is at this nexus, rather than on either the near or the far side of it, that the phenomenon we know as 'light' is generated. This phenomenon is not the objective, external *lumen*, nor is it the subjective, interior *lux*. It is rather a phenomenon of experience, of that very involvement in the world that is a necessary precondition for the isolation of the perceiver as a subject with a 'mind', and of the environment as a domain of objects to be perceived. Establishing this understanding of the process of vision and of the nature of light will be our next task.

Three twentieth-century thinkers

In order to set out the groundwork for an alternative metaphysics of vision, I shall embark in what follows on a kind of theoretical triangulation. I do this by reviewing the ideas of three mid-twentieth-century thinkers, all of whom had important things to say about vision which were critical, in one way or another, of Descartes. The first, Hans Jonas, went out of his way to stress the differences between vision, hearing and touch as sensory modalities. For him, vision was indeed the superior sense, due not to its identification with reason, but to its peculiar phenomenal properties. The second, James Gibson, rejected the two-stage model of visual perception, and with it the classic Cartesian dualism of body and mind. Gibson argued that perception is an activity not of the mind, upon the deliverances of sense, but of the whole organism in its environmental setting. Vision is not, then, indirect, as Descartes maintained, but direct. The third, Maurice Merleau-Ponty, has perhaps gone further than any other recent thinker in recognising that vision is not just a matter of seeing things but is crucially an experience of light. Refusing to set up any absolute boundary, or line of demarcation, between the perceiver and the perceived, Merleau-Ponty held that light is tantamount to what we experience, in vision, as an opening up of the body onto the world.

Hans Jonas

The distinctiveness of sight, for Jonas, lies in three properties that are unique to this sensory modality: namely, simultaneity, neutralisation and distance (Jonas 1966: 136). The first refers to the ability to take in the world at a glance, so that a manifold that is present all at once can likewise be apprehended all at once. Neither hearing nor touch can achieve this. Reiterating a well-established view that we have already encountered, Jonas argues that whereas one can see things, one hears only sounds rather than the entities whose activity gives rise to them. Thus one hears the bark but not the dog, whose presence can only be inferred on the basis of non-acoustic information. And there is no sound that is not suspended in the current of time. The duration of the sound one hears is the same as that of one's hearing it; what is disclosed over time is also apprehended over time. True, distinct sounds may coexist or be juxtaposed, but each belongs to one of several 'strands' proceeding concurrently, and cannot be apprehended apart from the temporal flow. Arrest the flow and what you have is not a coherent snapshot, but a collection of atomic fragments. Touch shares with hearing this quality of temporality, at least so far as the perceiver is concerned. Yet unlike hearing, the data of touch can be synthesised to reveal the stable presence of objects. In this respect, touch comes closer to vision: thus, up to a point, the blind can achieve with their hands what the sighted achieve with their

eyes. Nevertheless, the difference between touch and vision remains fundamental. The discovery of objects through touch necessitates an active exploration of the environment: this calls for movement and takes time. With vision you have only to open your eyes, and the world is there, already spread out as a ground for any further exploration of it. Only with vision, therefore, is it possible to distinguish being from becoming, and hence to entertain a concept of change. For hearing and touch, since they can know the world only through the movement of perceptual activity, there is neither change nor stasis, only becoming (Jonas 1966: 136–45).

The second property of sight, what Jonas calls neutralisation, lies in the disengagement between the perceiver and the seen. Touching something entails an action on your part, to which the object responds according to its nature. Hearing presupposes an action on the part of the object which generates the sound, to which you respond according to your sensibility. Thus while the balance of agency shifts from the subject (in touch) to the object (in hearing), there is in both an engagement between them, of a kind that is entirely absent from vision. The object need do nothing to be seen, since the source of the light by which it is revealed lies elsewhere. And to see the object one does not have to take up an attitude towards it. 'In seeing', Jonas writes, 'the percipient remains entirely free from causal involvement in the things to be perceived' (1966: 148). Thus vision is neutralising since it reveals the object simply for what it is. What is lost in terms of an intuitive under-standing of the connectedness of things is gained in terms of objectivity. Rather than *affecting* the perceiver, as touch and hearing do, vision offers to the perceiver an *image* which, handed over to thought, can be manipulated at will, without further consequence for the object itself. But precisely because of their neutralisation, the objects of vision are in a sense 'mute', since in revealing their presence they do not speak to us or address human concerns (Jonas 1966: 145–9).

The third property of sight, spatial distance, is relatively self-evident. In an environ-ment free from obstruction we can see a long way. Touch does not extend beyond the reach of the body, augmented perhaps by sticks or other such prostheses. Sound carries further, but has its limits, and is especially susceptible to distortion at the margins. Moreover when I hear a far-off sound, though I may be able to estimate the direction and distance of its source from where I now stand, I still have no idea – from the acoustic information alone – of what lies in between. It is peculiar to vision, by contrast, that it reveals not only distant objects, but also an encompassing landscape that stretches out from my present location to the horizon. I could, then, set out along a path that would take me to any one of these objects, with some foreknowledge of what to expect along the way (Jonas 1966: 149–52). Yet in an appendix, Jonas adds a crucial qualification to this argument. As he now admits, vision would never reveal the world in the way it does, arranged in depth and stretching away from us, were we not already used to moving through it, and in so doing, incorporating its features into structures of tactile awareness. Touch, in a word, confirms the materiality of the visible. Hence the motility of the body is a factor in the very constitution of vision and of the seen world. At first glance, this proposition seems at odds with the thesis of the simultaneity of visual perception: that the world can be taken in at a glance, from a fixed standpoint. Jonas's solution to the paradox is to argue that we are able to view the world as a spectacle, from a position of rest, precisely *because* we do so in the light of the 'accumulated experience of performed motion' (1966: 154) resulting from a history of previous activities. In short, the dynamics of bodily movement establish the essential foundation for the static experience of vision, but are not themselves part of that experience (Jonas 1966: 152–6).

James Gibson

With this last point, Gibson would have found himself in fundamental disagreement. Movement, in his view, is as integral to vision as it is to touch; moreover there is no need for the one sense to be *validated* by the other (Gibson 1966: 55). I shall not here attempt a full review of Gibson's ecological approach to visual perception, as others have done so elsewhere (Michaels and Carello 1981, Reed 1988b; see also Chapter Nine, pp. 166–8). However there are three aspects of this approach that I am particularly concerned to bring out here. First, I shall explain more precisely what Gibson meant by saying that visual as well as other modalities of perception are direct rather than indirect. Secondly, I show how Gibson's conception of the senses as perceptual systems, rather than as stimulus-specific registers of experience, renders the distinctions between vision, hearing and touch far less clearcut than we are inclined to think. Thirdly, I want to explore the specific argument by which Gibson denies that we ever see light as such. In this, I suggest, his ideas are still firmly rooted in the Cartesian tradition.

For Descartes, it will be recalled, the mind is unable to mingle with the world. Locked within the confines of a body, all it can do is to perform various calculative manoeuvres, on the basis of stimuli registered in the brain, in order to build up a more or less accurate representation of the world outside. This is what Descartes meant by describing perception – whether visual or tactile – as indirect. Gibson maintains, to the contrary, that perception is direct. By this he does not mean that it can somehow bypass the brain; any such suggestion would obviously be absurd. His point is rather that we should cease thinking of perception as the computational activity of a mind within a body, and regard it instead as the exploratory activity of the organism within its environment. As such, it does not yield images or representations. It rather guides the organism along in the furtherance of its project. The perceptually acute organism is one whose movements are closely tuned and ever responsive to environmental perturbations. For this reason, visual perception can never be disinterested or purely contemplative, as Jonas claimed. *What* we see is inseparable from *how* we see, and how we see is always a function of the practical activity in which we are currently engaged.

On the face of it Gibson would seem to agree with Descartes, that sight and touch are strictly comparable as modes of sensory contact with the environment. 'In many respects', he writes, 'the [haptic] system parallels vision' (1966: 134). Moreover we have seen that Gibson's view that perception of any kind depends on movement of the perceiver relative to the perceived also finds resonances in Descartes. Beneath the apparent convergence, however, their respective positions are diametrically opposed. For on the axis of contrast that Jonas draws between neutralisation and engagement, and which for him distinguishes sight from touch, the Cartesian perspective would join touch with sight on the side of neutralisation, whereas the Gibsonian perspective joins sight with touch on the side of engagement. Or to sum up:

	Touch	Sight
Descartes:	Neutralisation	Neutralisation
Jonas:	Engagement	Neutralisation
Gibson:	Engagement	Engagement

It would be wrong, Gibson argues, to think of the eyes, the ears or the sensitive surfaces of the skin simply as loci for banks of receptor cells that are, in turn, hooked up to centres

of projection in the brain. Rather, they are to be understood as integral parts of a body that is continually on the move, actively exploring the environment in the practical pursuit of its life in the world. Sight, for instance, is not an effect of the stimulation of photo-receptors in the retina, coupled to processors in the visual cortex. It is rather an achievement of a system that also encompasses the neuromuscular linkages controlling the movement and orientation of the *organs* in which the receptors are located. These organs may be specified on a number of levels of increasing inclusivity: thus 'the eye is part of a dual organ, one of a pair of mobile eyes, and they are set in a head that can turn, attached to a body that can move from place to place'. Together these organs comprise what Gibson calls the *perceptual system* for vision (Gibson 1979: 53, cf. 1966). Much of this is shared with the system for hearing, and with that for touch. The head, for example, is common to vision and hearing: the action of turning the head so as to balance the auditory input from a sound source to the two ears, located on each side, also turns the eyes, at the front, so that they are oriented directly towards the source. As this example demonstrates, the perceptual systems not only overlap in their functions, but are also subsumed under a total system of bodily orientation (Gibson 1966: 4, 49–51; 1979: 245). Looking, listening and touching, therefore, are not separate activities, they are just different facets of the same activity: that of the whole organism in its environment.

Hence the idea, proposed by Jonas, that having made a thorough exploration of the world through movement, relying on the sense of touch, one could then stop still and take it in at a glance through the eyes, would have made no sense to Gibson. This is for two reasons: first, that we explore the world with our eyes open (and even when we stop we look about); and secondly, that vision does not yield a snapshot, or even a series of snapshots. It rather yields an appreciation of objects 'in the round'. We do not see an object, any more than we feel it, from a single point of view. Rather, by 'running our eyes over it' – as we might run our fingers over it in tactile perception – we discover its form as the envelope of a movement, that is of the continuous modulation of the array of reflected light reaching the eyes. Indeed it is because vision, like touch, takes place over time along what Gibson calls a 'path of observation' (1979: 197), that we can see aspects of objects which, at any particular moment, may be hidden by occluding edges. And since the information yielded by the operation of perceptual systems is specific to the things encountered, rather than to the particular sensory keyboard that is activated, a switch in the balance of stimulation – say from the tactile to the visual – may make little appreciable difference to what is actually perceived. Of course the *sensations* of vision are not the same as those of touch and hearing. But the 'patterns in the flux of sound, touch, and light from the environment', which specify the objects of one's attention, may be strictly equivalent (Gibson 1966: 54–5; 1979: 243).

This argument carries an important corollary. For if what we see is delineated by the patterning or modulation of reflected light as it is picked up by the moving organs of sight, then the one thing we never actually see must be light itself. To the question, 'Of all the possible things that can be seen, is light one of them?', Gibson answers categorically in the negative (1979: 54). Rather, he says, we see *things* by means of light. In view of Gibson's resolutely anti-Cartesian stance, this conclusion – which is fully in accord with Descartes' views on the matter – comes as something of a surprise. Indeed he admits to being vexed by the question of how certain phenomena seem to announce their presence directly, as radiant light, rather than by way of the illumination of their surfaces (1966: 220). Is this not how we come to perceive a flaming fire, a candle lamp, the sun and moon, a shaft of sunlight through the clouds, a rainbow, the glare of the sun reflected

from a glossy surface, or the scintillations of light off water? Intuitively, it seems that in every one of these cases light is just what we *do* see. Yet for each, Gibson has his answer: the fire and the lamp are 'specific objects and are so specified', as are the celestial bodies. We do not really see shafts of sunlight, but only illuminated particles in the air. Dazzled by the sun, what we actually perceive is a 'fact about the body', namely its excessive optical stimulation, experienced as a kind of pain. As for rainbows, scintillations and the like, these 'are all manifestations of light, not light as such' (1979: 55).

But as the examples mount up, Gibson's defence becomes less and less plausible. In what sense can we possibly regard a flame as an object? Ignoring the knowledge of science and schoolbooks, how are the sun and moon specified?[13] When it comes to beams of sunlight, common sense tells us that we see the light by way of airborne particles, and not vice versa. If excessive optical stimulation causes pain, does this make it any less an experience of light? What if the glare were less intense, and caused no appreciable discomfort: would we, then, cease to be aware of it? Finally, it is difficult to see how 'manifestations of light' can possibly be distinguished from 'light as such' without resorting to a highly reductive notion of what light actually is. Indeed this is precisely what Gibson does. 'All we ever see', he insists, 'is the environment or facts about the environment, never *photons or radiant energy*' (1979: 55, my emphasis). Gibson's 'light', in short, is the *lumen* of modern physics.[14] At no point does he ever think of it as anything other than a kind of energetic impulse, a source of stimulation that, if it exceeds a certain threshold, causes photoreceptor cells to 'fire'. The resulting sensations, he insists, do not in themselves constitute the basis for visual perception. No amount of light will cause us to see, unless that light is structured on account of its reflection from illuminated surfaces in the environment. Thus light carries the information for perception, but is never perceived *as such*.

Maurice Merleau-Ponty

It is here, above all, that Gibson's ecological psychology parts company with the phenomenology of Merleau-Ponty. Though they speak very different intellectual languages, there is much in common between what Gibson and Merleau-Ponty have to say. For both, the senses exist not as distinct registers whose separate impressions are combined only at higher levels of cognitive processing, but as aspects of functioning of the whole body in movement, brought together in the very action of its involvement in an environment. Any one sense, in 'homing in' on a particular topic of attention, brings with it the concordant operations of all the others. In his *Phenomenology of Perception*, Merleau-Ponty compares this integration of the senses in action to the collaboration of the eyes in binocular vision (1962: 230–3). Just as the unity of the object of vision is not the result of some 'third person process' which produces a single image out of two monocular images, but is rather given in the way the two eyes 'are used as a single organ by one single gaze', so the unity of a thing as an 'inter-sensory entity' lies not in the mental fusion of images founded on different registers of sensation, but in the bodily synergy of the senses in their convergent striving towards a common goal. Thus 'my gaze, my touch and all my other senses are together the powers of one and the same body integrated into one and the same action' (1962: 317–18). In short, for Merleau-Ponty as for Gibson, it is in their collaborative bearing on features of the world, rather than their common accountability to processing centres in the mind, that the senses are conjoined.

Like Gibson, too, Merleau-Ponty regards touch and vision as comparable modes of sensory engagement with the environment. This is not to say they are equivalent, since

each brings with it 'a structure of being that can never be exactly transposed' (1962: 225). That is why formerly blind persons, whose sight has been restored, initially find their predicament so bewildering: tactile experience turns out to be a poor guide to the visual world, not because it is relatively impoverished but because the tactile world is differently *structured* (1962: 222–4). Nevertheless, Merleau-Ponty surmises that the visual gaze functions as a 'natural instrument' of perception in much the same way as does the blind man's stick (1962: 153). The analogy, of course, is drawn from Descartes. Yet in his celebrated essay on 'Eye and mind', Merleau-Ponty takes it as the starting point for an all-out attack on the whole Cartesian programme (Merleau-Ponty 1964a: 169–78). His objection, however, is not to the comparison of the visual gaze to the tactile probe, but to the idea that both are harnessed to the project of constructing internal representations of an external reality. The truth, he maintains, is quite otherwise. For like the stick, the gaze is caught up in a dialogic, exploratory encounter between the perceiver and the world, in which every movement on the part of the perceiver is a questioning, and every reaction on the part of the perceived is a response. Thus 'the gaze gets more or less from things according to the way it questions them, ranges over or dwells on them' (1962: 153).

Both Gibson and Merleau-Ponty are adamant in their rejection of the Cartesian idea of vision, in Merleau-Ponty's words, 'as an operation of thought that would set up before the mind a picture or a representation of the world' (1964a: 162). Indeed the perceiver, they would say, has no need for such a picture in order to act in a way that is attuned to the features of his or her surroundings. Since my body inhabits the world, and since – to all intents and purposes – I and my body are one and the same (Merleau-Ponty 1962: 206), it follows that I, too, am an inhabitant of the world rather than of a space inside my head. And for the same reason, I can always consult the world to orient my movements, rather than an internal cognitive representation. Like Gibson, Merleau-Ponty stressed that while there cannot be vision without movement, this movement must also be visually guided: it must 'have its antennae, its clairvoyance' (1964a: 162). But whereas Gibson asked how it is possible for the perceiver to see objects in the environment, Merleau-Ponty went one step further back. For how could there be an environment full of objects, he asked, except for a being that is already immersed in the lifeworld, in 'the soil of the sensible' (1964a: 160), and therefore caught up in a visual field that is pre-objectively given? Such involvement must be ontologically prior to the objectification of the environment that Gibson takes as his point of departure. In short, before 'I see *things*' must come 'I can *see*'. So what does it mean, to see?

Merleau-Ponty's essay 'Eye and mind', his last published work, is an attempt to answer this question. The arguments of the essay are not easy to follow, but one can get the gist of them by performing a simple experiment. Close your eyes for a while, and then open them again. Do you have the impression that you are staring out upon the world through a hole (or perhaps two holes) in the front of your head? Is it as though you were looking through the windows of your unlit house, having opened the shutters?[15] Far from it. Rather, it seems that you are out there yourself, shamelessly mingling with all you see, and flitting around like an agile spirit from one place to another as the focus of your attention shifts. It is as if the walls and ceiling of your house had simply vanished, leaving you out in the open. In short, you experience seeing not as seeing *out*, but as *being* out – until, that is, you close your eyes again, at which point the spirit is instantly captured and put back inside, imprisoned in the dark and eery confines of a shuttered enclosure, your head. For Descartes the light of the mind (*lux*) was in this darkness, which is why he thought the blind could see. But experience teaches us differently. It is, as Merleau-

Ponty writes, that through vision 'we come into contact with the sun and the stars, that we are everywhere all at once'. Or again, vision 'is the means given me for being absent from myself' (1964a: 186–7). We now have a clue to what Merleau-Ponty meant by his repeated insistence on the indistinguishability of the seeing and the seen, or the 'sensor and the sensible' (cf. 1962: 214). This is primordially evident in the case of my body, which both sees and is seen, but equally true of the whole 'fabric of the world' in which it is caught up. And we can understand what he means by the assertion that vision is not *of* things but happens *among* them. For it is constitutive of the whole perceptual field, drawn around myself at its centre, which both they and I inhabit.

All this is a far cry from the picture that Jonas paints of the immobile and detached spectator, contemplating a world with which he has no causal involvement whatever. Returning to an opposition that I have already introduced in the context of my initial discussion of the anthropology of the senses, Merleau-Ponty replaces the image of the spectator with that of the *seer*. 'Immersed in the visible by his body', he writes, 'the see-er does not appropriate what he sees; he merely approaches it by looking, he opens himself to the world' (1964a: 162). Raise your eyelids, and you find yourself, almost literally, 'in the open'. Indeed, this little phrase perfectly captures what Merleau-Ponty portrays as the magic – or delirium (1964a: 166) – of vision. We live in visual space from the inside, we inhabit it, yet that space is already outside, open to the horizon. Thus the boundary between inside and outside, or between self and world, is dissolved. The space of vision both surrounds us and passes through us (1964a: 178). Elsewhere, Merleau-Ponty imagines himself gazing up at the blue sky:

> As I contemplate the blue of the sky I am not *set over against* it as an acosmic subject; I do not possess it in thought, or spread out towards it some idea of blue such as might reveal the secret of it . . . I am the sky itself as it is drawn together and unified, and as it begins to exist for itself; my consciousness is saturated with this limitless blue.
>
> (1962: 214, original emphases)

Compare this with Gibson, who answers his own question of how one might visually perceive 'a luminous *field*, such as the sky?', with the response: 'To me it seems that I see the sky, not luminosity as such' (1979: 54).

The sky presents a problem for Gibson precisely because he is unable to countenance the environment in any other way than as a world of objects 'set over against' the perceiver, and revealed through the patterns of ambient light reflected from its opaque, outer surfaces. Yet the sky has no surface. It is not a thing, like a building or a tree, off which light rebounds. On the contrary, the sky is openness or transparency itself, sheer luminosity, against which things stand out by virtue of their opacity or closure. To suppose, as Gibson does, that one sees the sky as distinct from its luminosity is like pretending that one hears thunder rather than its sound, or feels the wind rather than a current of air. What is thunder if not sound, or the wind if not airflow? On hearing thunder, or feeling the wind, it is as though one's very being mingles with the surrounding medium and resonates with its vibrations. Likewise, sunlight and moonlight present themselves to vision, in Merleau-Ponty's words, as 'kinds of symbiosis, certain ways the outside has of invading us and certain ways we have of meeting this invasion' (1962: 317). This is not to reduce light to radiant energy or photons, as in a physicalist description; nor is it to conclude, on the other extreme, that light shines only in the mind while the world might as well be pitch dark. It is to recognise that for persons who can see, light is the *experience* of inhabiting

the world of the visible, and that its qualities – of brilliance and shade, tint and colour, and saturation – are variations upon this experience.[16]

Perhaps Gibson was right, after all, to say that we do not see light 'as such', since light is not an object. It rather constitutes, for the sighted, the pre-objective foundation of existence, that commingling of the subject with the world without which there could not be visible things, or 'facts about the environment', at all. Light, in short, is the ground of being out of which things coalesce – or from which they stand forth – as objects of attention. Thus as Merleau-Ponty writes (1964a: 178), we do not so much see light as see *in* it. And for all who can see in it, the experience of light is perfectly real. Indeed we have no more reason to doubt the reality of light than we have to question the experience of blindness for those who *cannot* see in it. Yet we are all too ready to take it for granted: it is the very familiarity of our experience, of that openness to the world sensed as light, that causes it to hide from us. So busily preoccupied are we with all the things that vision reveals to us that we forget the foundational experience upon which it rests. The process of seeing in light is swallowed up by its products, objects of sight. And by the same token, the joy and astonishment of the discovery that 'I can *see*' gives way to the mundane indifference of 'I see *things*'. The message of Merleau-Ponty is that we need to reverse this perspective, to recover the sense of vision that is original to our experience of the world, and that is a precondition for its objectification.[17]

This, finally, is what motivates the work of the painter. A painting, for Merleau-Ponty, is not just another object of vision. You do not look at it, nor do you see it, as you would any ordinary thing. Rather, you 'see according to it, or with it' (1964a: 164). Like all sighted people, painters see in light, and it is the inspiration for their work. They cannot afford to dismiss their experience as an illusion, and nor can we, unless we wish to write off the history of painting as an aberration caused by the overstimulation of excessively susceptible minds (1964a: 186–7). However the painter's vision, Merleau-Ponty insists, 'is not a view from the *outside*, a merely "physical-optical" relation with the world'. It is rather a 'continued birth', as though at every moment the painter opened his eyes to the world, like a new-born infant, for the first time. The birth of his vision is, at one and the same time, the 'concentration or coming-to-itself of the visible'. And so the painting to which it gives rise is an embodiment of this creative movement: it does not *represent* things, or a world, but shows 'how things become things, how the world becomes a world' (1964a: 167–8, 181).[18] Thus to see with, or according to, a painting is to question the ordinariness of our everyday perception of objects, to rekindle in us the astonishment of vision, and to remind us that there are things in the world to be seen only because we first can see.

In the course of this review of the ideas of our three thinkers – Jonas, Gibson and Merleau-Ponty – we have progressed from a notion of vision as a mode of *speculation*, to one of vision as a mode of *participation*, and finally to one of vision as a mode of *being*. For Jonas the visual world is presented to the disinterested observer as a scene or spectacle; for Gibson it becomes an environment that surrounds the engaged participant but whose preformed surfaces nevertheless remain closed and impenetrable to the eye. For Merleau-Ponty the visual world is given to subjective experience as a cosmos that is open and transparent, that one can see into rather than merely look at, and that continually comes into existence around the perceiver. As we have already seen, recent debates in both anthropology and philosophy concerning the role of the senses in human societies have tended to assume that vision is inherently speculative, and have paid little heed to the possibility of alternative modalities. When it comes to touch and especially sound, however, a quite

different view prevails, and this has led to the positing of a great sensory divide between visual perception on the one hand, and auditory and tactile perception on the other, and with it, between Western societies in which the former allegedly dominates, and non-Western societies which are said to be given over to the latter. My aim, now, is to replace the orthodox, speculative notion of vision with a participatory or existential one. Once this is done, the 'great divide' simply vanishes.

THE HEARING EYE AND THE SEEING EAR

After that long excursion into theories of vision, our immediate priority must be to return to sound and hearing. Earlier on, I cited a passage from the work of the musicologist Zuckerkandl, *Sound and Symbol* (1956), in which he contrasts the properties of sight and hearing by way of a rather gross characterisation of the attitudes of deaf and blind people. I shall consider what such people have to say about their own sensory experience in the following section. For the moment, however, I intend to look rather more closely at Zuckerkandl's study, for two reasons. First, I want to bring out the close parallels between the way Zuckerkandl speaks of the musical experience of sound, and the way Merleau-Ponty speaks of the painterly experience of light. These experiences, it turns out, are virtually identical. Secondly, although Zuckerkandl maintains that vision and hearing are generally opposed, he admits that this is not universally so, and towards the end of his study he speculates that this opposition may not have been given from the start, either in the development of the individual or in the evolution of human culture. If he is right in supposing that vision split off from hearing in the course of an evolution towards modern Western civilisation, then it is clearly inadmissible to retroject the resulting distinction between these sensory modalities onto humanity at large.

For the most part, Zuckerkandl is quite categorical about the difference between the way in which the world is perceived through the eye and through the ear. The eye reinforces a barrier separating two domains: the inner domain of the mind or consciousness, and the outer domain of the world. It keeps things at a distance. They stay 'out there', fixed in their proper places in an overall spatial array that can be mapped out in terms of intervals and boundaries. The space of vision is one from which you, the viewer, are excluded, a space where things are but you are not. Thus the visual experience of space is essentially disjunctive. The domains of 'inner' and 'outer', as Zuckerkandl writes, 'face each other like two mutually exclusive precincts on either side of an impassable dividing line'. But in hearing, the distinction between 'precincts' is transformed into one between 'directions'. In the inward direction, the world penetrates consciousness; in the reverse, outward direction, consciousness penetrates the world (1956: 368–9). In place of the barrier that the eye throws up around the perceiving subject, the ear builds a bridge which allows a two-way flow of sensory traffic. When you see things that are far away, they are perceived to be *at* a distance, but when you hear far-off sounds they seem to be *coming from* a distance (p. 291). The space of hearing, then, is not set over against you, the listener, but streams towards you and into you. It is a space not of places but of flows, where nothing can be divided and nothing measured. Your auditory experience is essentially participatory, one of immersion in a 'boundless indivisible oneness' (p. 336). And so the quality 'out there', that we experience in vision, is replaced by the quality 'from-out-there-toward-me-and-through-me'. Or in other words, the step from visual to auditory perception is 'like a transition from a static to a fluid medium' (p. 277).

What I find so remarkable about Zuckerkandl's account of hearing is that it matches point by point, almost down to the details of the rhetoric, what Merleau-Ponty has to say about vision. We have only to recall Merleau-Ponty's conception of visual space as both 'surrounding' and 'passing through' the perceiver, of consciousness as 'saturated' with luminosity, of the seer as 'immersed' in the visible, of the outside 'invading' us and of our 'meeting this invasion' (1962: 214, 317; 1964a: 162, 178). Echoing Zuckerkandl's notion of inward and outward currents, Merleau-Ponty speaks of an 'inspiration and expiration of Being, action and passion so slightly discernible that it becomes impossible to distinguish between what sees and what is seen' (1964a: 167). Revealing, too, is the fact that in order to convey the sense of what he means by vision, Merleau-Ponty has occasional recourse to auditory metaphor – the precise reverse of the use of visual metaphor to describe auditory experience that we have already encountered in the Saussurian notion of the sound-image. 'Quality, light, colour, depth', he writes, 'are there only because they awaken an echo in our body and because the body welcomes them' (1964a: 164). If for Saussure it sometimes seems as though the sounds of speech were seen and not heard, for Merleau-Ponty it can seem as though we listen with the eyes. In other words, though our experience may be one of seeing in light, it is nevertheless an experience that has all the qualities of hearing.

This thought had also occurred to Zuckerkandl. It arises in the context of a discussion of the pros and cons of either playing or listening to music with the eyes closed. According to one view, the eye is so closely implicated in a particular apprehension of space, occupied by 'corporeal things in their places', that it actively inhibits our involvement in the fluid space of forces that music opens up to us. It holds us back, and makes us unwilling to entrust ourselves with the whole of our being to sound. But Zuckerkandl is not fully convinced. Is it really necessary, he asks, to blind ourselves temporarily in order properly to hear? Is vision capable only of seeing things in their places? 'Can the eye perhaps hear too?' (1956: 341). Zuckerkandl believes that it can, albeit exceptionally, and that there are indeed 'activities of the eye that go beyond the function of seeing a thing in a place – and go beyond it in a particular direction, *which it seems natural to compare with the mode of perception of the ear*' (p. 344, my emphases). To exemplify the point Zuckerkandl imagines himself, just as had Merleau-Ponty before him, gazing into the blue sky. What he sees is not a 'thing out there' but 'boundless space, in which I lose myself'. But whereas Merleau-Ponty uses this example to illustrate the coalescence of the perceiver and the world which he takes to be fundamental to apprehending the space of vision, Zuckerkandl uses it to clarify his conception of auditory space! For him, the experience one has, looking up at the sky, is precisely what it means to hear.

It seems, then, that the kind of opening up to the world that Merleau-Ponty calls seeing is more or less identical to that which Zuckerkandl calls hearing. In Zuckerkandl's book, everything that Merleau-Ponty has to say about painterly vision would fall under the rubric of 'hearing with the eyes'. Indeed it is above all in the realm of painting, he thinks, that we find a perception of forces and dynamic relations strictly akin to the hearing of tones in music. The space of the picture, along with the things represented therein, 'is not simply set off from the observer; rather it opens itself to him, takes him into itself, passes into him' (Zuckerkandl 1956: 345). But reversing the perspective, all of what Zuckerkandl says about hearing could be regarded, from Merleau-Ponty's angle, as 'seeing with the ears'. This expectation is confirmed in the *Phenomenology of Perception*, where Merleau-Ponty devotes special attention to 'the sight of sounds'. Thus 'when I say that I see a sound, I mean that I echo the vibration of the sound with my whole sensory being' (1962: 234). This equivalence of seeing and hearing, however, raises an intriguing question. When

we hear with the eyes, or conversely when we see with the ears, is the experience one of light or sound?

Before we can answer this question, we have first to recognise that sound is no more a physical impulse that arrives from outside than it is a purely mental, 'inside the head' phenomenon. Indeed everything we have said about light applies to sound also. Like light, sound exists neither on the inner nor on the outer side of an interface between mind and world. It is rather generated as the experiential quality of an ongoing engagement between the perceiver and his or her environment. Sound is the underside of hearing just as light is the underside of vision; we hear in one as we see in the other. Now it would be foolish to suggest that gazing up at the sky yields anything other than an experience of light. Yet as seeing is tantamount, in this case, to hearing, it would be equally foolish to deny that it could also, and at the same time, be experienced as sound. Poets, as Zuckerkandl points out, have never had any difficulty with the idea (1956: 341). A particularly eloquent example of the sight of sound, or hearing with the eye, is offered by the poet David Wright, who speaks of how he 'hears' things, or rather movements, which most of us take to be silent:

> I take it that the flight of most birds, at least at a distance, must be silent . . . Yet it *appears* audible, each species creating a different 'eye-music', from the nonchalant melancholy of seagulls to the staccato flitting of birds.
>
> (Wright 1990: 12)

The particular poignancy of this example derives from the fact that Wright is himself deaf. He cannot therefore hear with the ears, as other people do. But for precisely that reason, his visual experience has an auditory dimension that is missing for most people with normal hearing, placed in similar situations.

Much has been made of the phenomenon of synaesthesia, the apparent capacity of certain perceivers to register an experience in one sensory modality on the basis of sensations delivered in another. The synaesthetic may, for example, claim to see certain forms or colours on hearing a musical melody, or to hear particular sounds on watching a silent movement. Wright's report of hearing the flight of distant birds might well be taken as an instance of the latter. Yet built into the very definition of synaesthesia is a two-fold distinction between sensation and perception on the one hand, and between discrete sensory modalities on the other. Following both Gibson and Merleau-Ponty, I have suggested that the eyes and ears should not be understood as separate keyboards for the registration of sensation but as organs of the body as a whole, in whose movement, within an environment, the activity of perception consists. 'My body', as Merleau-Ponty puts it, 'is not a collection of adjacent organs but a synergic system, all the functions of which are exercised and linked together in the general action of being in the world' (1962: 234). Sight and hearing, to the extent that they can be distinguished at all, are but facets of this action, and the quality of the experience, whether cast in light or sound, is intrinsic to the bodily movement entailed, rather than possessed 'after the fact' by the mind. So if I hear the flight of birds it is because, following their course across the sky, the movement of my own body – of my eyes, of my hand, indeed of my entire posture – resonates with theirs. From this point of view, the 'problem' of synaesthesia simply vanishes.

For Zuckerkandl, too, when Dante speaks of Hell as 'a place dumb of all light', or when Goethe declares that light 'trumpets', they are referring not to synaesthesia but to 'a real perception through the eyes, but which nevertheless has the characteristics of hearing' (1956: 341). Under all normal circumstances, Zuckerkandl maintains, this kind of

perception is overshadowed by the ordinary sight of things, and re-emerges only during rare moments of ecstasy when the boundary between the perceiver and the world appears to dissolve. But for the new-born baby, opening its eyes upon the world for the first time, or the previously blind person to whom sight has been restored through a medical procedure, the experience must be overwhelming. As William James wrote, with acknowledgement to Condillac, 'The first time we see *light* . . . we *are* it rather than see it' (James 1892: 14). Light – or 'I can see', which is another way of saying the same thing – is in this situation quintessentially an experience of being. Ihde notes that the first impressions of a blind person, on gaining sight, are often reported to be akin to those of listening: the patient 'is impressed by what we might call the *flux* and *flow*' (Ihde 1976: 63).[19] For the baby, of course, there are not yet *things* to be seen, for the separation of the self from the world, and the consequent process of objectification, have hardly begun. But long before it first opens its eyes, the baby can already hear quite well. For every newborn, as Schafer says (1985: 96), hearing precedes vision. Thus while Berger (1972: 7) may be right to say that in the life of the child, 'seeing comes before words', it is still the case that the infant hears the sounds of speech, and above all its mother's voice, long before it can see. It is therefore entirely understandable that the earliest visual perception should be experienced as a hearing with the eyes.

The conclusion to be drawn from this, as Zuckerkandl recognises, is that the 'normal' function of the eye – 'the perception of things in places' – is not given from the start but is the result of a development in the field of vision, 'whose earlier stages are not so sharply differentiated from hearing as later ones' (1956: 342). From this conclusion, Zuckerkandl launches into an argument which, by his own admission, is entirely speculative, but which is nevertheless of profound significance for the anthropology of the senses. If vision gradually diverges from hearing in the life-history of the individual, could this not also occur, along the same lines and through similar stages, in the evolution of culture? Could the congruence of sight and hearing, so quickly overtaken in individual development, have once characterised an entire epoch? And could it persist, perhaps, in the 'magical abilities of . . . primitives, . . . based upon a direct seeing of space as force, a dynamic communication between within and without'? If so, then 'we should have in music the miraculous echo of a world that once lay open to sight' – a world that otherwise survives only in the visual arts, especially painting (1956: 343–5). While the ontogenetic and evolutionary assumptions built into this argument, and especially the identification of 'primitive' perception with that of children, may no longer be acceptable today, Zuckerkandl's remarks nevertheless suggest something very important, namely, that the distinction between vision and hearing, as generally understood in the Western tradition, is not natural or universal to humanity but the outcome of a specific historical development. In comparisons between Western and non-Western societies, therefore, the distinction cannot form part of the explanation for differences in sensory experience, but is part of what has to be explained.

THE SENSORY EXPERIENCE OF BLIND AND DEAF PEOPLE

It is now time to return to the two thought experiments with which I began. To recall, in the first you listen blindfold to the sound of an oncoming train; in the second you watch it pass with your ears plugged. In the one case, you suppose, the sound gets inside you and shakes you up; in the other it is as though the train glided by in a world apart from the one you inhabit. Now these experiments do indeed tell us much about the ways we

imagine vision and hearing to work. But they turn out to be a poor guide to what is actually going on, at least in the case of people whose eyes and ears are functioning normally. Seeing with the ears stopped is qualitatively different from seeing without, for the simple reason that a good deal of the information controlling the movements of the *organs* of sight, including the eyes, head and whole body, is picked up by hearing. Without that information, vision is disoriented, which is precisely why, in the second experiment, your visual attention seemed so detached from the train's movement. Conversely, hearing blindfold is qualitatively different from hearing with one's eyes open, for although the ears (unlike the eyes) are immobile relative to the head, hearing is affected by head and body movements which are partially guided by information picked up by the operations of sight. Again, it is the lack of such information, and the ensuing loss of auditory control, that accounts for the violence with which the sound of the unseen train seems to assault your senses.

If our experiments mislead us when it comes to normal vision and hearing, could they nevertheless tell us something about the experience of people who are deaf or blind? Is the deaf person, of necessity, an impassive observer of things in a world from which he or she feels somewhat alienated? And are the blind, conversely, participants in a world in which all is movement and becoming, yet inevitably at the mercy of its currents? Such views are commonly encountered; I have already cited, as an example, a passage to this effect from Zuckerkandl. They are not, however, supported by the testimony of blind and deaf people themselves. These people do not feel that their experience of the world is any less complete, or has any less integrity, than that of anyone else. In this respect it is quite unlike the experience of normally sighted and hearing persons, on finding themselves suddenly but temporarily blinded or deafened. Is it the case, then, that those for whom blindness or deafness is a permanent condition compensate for the lack of one sense by augmenting the powers of those remaining? Once again, the answer appears to be 'no'. Indeed David Wright, speaking as one who is profoundly deaf, argues that the theory of compensation is a mistake, and an irritating one at that (Wright 1990: 12, 111). It is in error for two reasons: first, aural perception actually deteriorates when it is not oriented by vision, and vice versa; and secondly, the theory mistakes a heightened sensitivity to specific movements – aural or gestural – which are critical for the interpretation of what is going on for a general enhancement of the sense as a whole. Blind and deaf people, like everyone else, sense the world with their whole body, and like everyone else, too, they have to cope with the resources available to them. But their resources are more limited, and for this there is absolutely no compensation. The life of the blind person, as John Hull puts it, 'is experienced as being intact, although the scope of activity has in many ways become smaller'. It is not like a round cake from which a substantial slice has been cut out. It is more like a smaller cake (Hull 1997: xii).

Granted that the experience of the blind or deaf person is not any particular segment, or 'cut', of the total experience of the visually and aurally unimpaired, but is a totality of a very different kind, I believe (with Ihde 1976: 44) that we can still learn a great deal about how visual and auditory perception work – even for people with normal sight and hearing – from a comparison of these different experiences. The comparison is of course complicated by the fact that there are individual variations in degrees of blindness and deafness. In what follows I shall assume the total non-functioning of eyes and ears respectively. I begin with blindness, drawing on the superb and extremely moving account by John Hull of his own experience of going blind, and of adjusting to this condition, as an adult. The account is revealing in two ways. First, it highlights features of visual perception that we normally rely on but tend to take for granted, by bringing out the problems

that ensue from their absence. Secondly, it reveals unexpected properties of aural perception that are critical for the blind, but which may be equally at work among sighted people although not recognised for what they are. Apropos the first, I shall focus on eye-to-eye contact; apropos the second, I shall consider the phenomenon of echolocation. As a prelude to both, however, a few general remarks are in order about how blind and sighted people, respectively, perceive the space around them.

Being blind

There is much in Hull's account that corroborates the ideas of Hans Jonas, reviewed in an earlier section. The perception of the blind person, dependent as it is on touch and hearing, is fundamentally suspended in the current of time. Visual space is presented to the sighted all at once, but tactile space has to be assembled by the blind, bit by bit, through a repetitive and time-consuming exploration with the fingers. Thus the blind person may take days 'to discover what the sighted person will grasp in a split second' (Hull 1997: 183). Acoustic space is similarly temporal. Unlike the objects of touch, however, which can always be touched again, the manifold inhabitants of acoustic space have an ephemeral nature, passing in and out of existence along with the sounds they make. This is not a world of being – 'the silent, still world where things simply are' – but a world of becoming where there is only action, and where every sound marks a locus of action (pp. 72–3). In this world, 'sounds come and go in a way that sights do not' (pp. 145–6). So do the agents, especially people, who make the sounds. As a sighted person, I can see when someone else is in the room before he or she begins to speak or approaches to shake my hand. But for the blind person, the voice or handshake comes from nowhere. One has the feeling of being grasped or accosted, unable either to resist or to choose one's assailant (p. 87). Other people, with their voices and tactile gestures, appear suddenly and disappear equally abruptly. 'The intermittent nature of the acoustic world', Hull writes, 'is one of its most striking features' (p. 73). The seen world can never escape one's eyes, it is always there, and one can return to it again and again. But the world of sound escapes as fast as it comes into being. And the sound that has passed can never be recovered (p. 145).

Can the blind person, then, ever enjoy an experience comparable to that of the sighted, of being placed in something like a landscape that can be taken in as a totality, with its infinitely variegated surfaces, contours and textures, inhabited by animals and plants, and littered with objects both natural and artificial? There is one circumstance in which this is possible, in Hull's experience, namely when it is *raining*. For the sounds of raindrops, which are perceived to come not from any particular point but from all quarters at once, reveal in every detail the surfaces on which they fall. 'Rain', Hull writes, 'has a way of bringing out the contours of everything; it throws a coloured blanket over previously invisible things; instead of an intermittent and thus fragmented world, the steadily falling rain creates continuity of acoustic experience . . . This is an experience of great beauty' (1997: 26–7). There is indeed a certain parallel between the ecstasy of hearing that Hull describes and what, for the sighted, I have described as the astonishment of vision, when the world is revealed to the seer as though the fog in which it had been enveloped were lifted, and he or she were gazing upon on it for the first time. Rain does for the blind what sunshine does for the sighted, bathing the world in sound as the sun bathes it in light. Immersed in the audible, to borrow and adapt Merleau-Ponty's words, the listener opens himself to the world: 'My body and the rain intermingle, and become

one audio-tactile, three-dimensional universe, within which and throughout the whole of which lies my awareness' (Hull 1997: 120).

Now in my earlier discussion of the maxim 'vision objectifies, sound personifies', I noted that it is closely bound in the Western tradition with a certain construction of the person, according to which an inner essence, identified with the voice, is supposed to hide behind – but nevertheless to sound through – an outer mask identified with the face. The voice can be heard, the face seen – unless, that is, one is in the company of another who happens to be blind. Yet the view is commonly expressed that for the blind their inability to see the faces of others can be a positive advantage. For they are not, like the rest of us, susceptible to outward impressions. Thus did David Hume, in the eighteenth century, address a blind acquaintance, the Edinburgh poet Thomas Blacklock: 'Your passion . . . will always be better founded than ours, who have sight: we are so foolish as to allow ourselves to be captivated by exterior beauty: nothing but beauty of the mind can affect you' (cited in Rée 1999: 40). In our present times the blind French writer Jacques Lusseyran takes the same view: the blind inhabit a world 'free of the deception of physical appearances, where what and how something is said reveals its true purpose' (cited in Hill 1985: 109). But in Hull's experience matters are not that simple. For him the face is not a mask but is as intimately bound up with the life and identity of the self as is the voice. And of all the components of the face, the most revealing, and the topic of our greatest attention and fascination, are the eyes.

If there is a critical difference between face and voice, it is not so much that one is seen and the other heard, than that you can hear your own voice whereas you cannot see your own face. 'I live in the facial expressions of the other', writes Merleau-Ponty, 'as I feel him living in mine' (1964b: 146). From this stems what John Berger calls 'the reciprocal nature of vision' – a reciprocity that is even more fundamental, in Berger's view, than that of spoken dialogue. For in eye-to-eye contact, he writes, 'the eye of the other combines with our own eye to make it credible that we are part of the visible world' (Berger 1972: 9).[20] Thus your visibility, your identity, indeed your very existence as a person, is confirmed in the sight of others. In normal circumstances, to see another person is to know you can be seen by them; to see a place is to know that you could, in principle, be seen by someone standing there. But when the other person is blind the reciprocity of vision breaks down. Suppose that I am sighted and you are blind: while I can see your face, I am also aware that you are not looking at me. It seems that I am not there for you. But not being able to see the faces of others leads you to imagine that others, conversely, cannot see you. Hull vividly describes the nagging fear of having no face, the loss of consciousness associated with perceived invisibility. 'Because I cannot see, I cannot be seen . . . It would make no difference if my whole face disappeared. Being invisible to others, I become invisible to myself'. It requires a real effort of will, if you are blind, to remind yourself that you can still be seen (Hull 1997: 51–2).

Far from leading to deep intersubjectivity, to a greater sense of belonging, connectedness and participation, as the received stereotype implies, blindness results – at least in Hull's experience – in an overwhelming feeling of distance and withdrawal. 'People', as he puts it, 'become mere sounds', and 'sounds are abstract' (1997: 21, 48). For him, quite contrary to conventional wisdom, vision personifies, whereas sound objectifies. Hull writes as one who has been fully blind for only a few years: he knows very well what it is like to be able to see the faces of others, and what he says must surely resonate with the experience of every sighted person. Why then, against all the evidence of our senses, do we cling to the illusion that sight is inimical to sociality, that it individualises, isolates and

abstracts? Is it because we take, as a prototypical scenario of vision, the situation of looking *at* an inert, opaque object, rather than that of looking *into* the eyes of an active, lively subject – whose eyes are also looking into one's own? If so, does this not provide further proof of what has already become apparent from my first critique of the anthropology of the senses: namely, that it is not vision that objectifies the world, but rather the harnessing of vision to a project of objectification that has reduced it to an instrument of disinterested observation? Our very familiarity with the reciprocal, intersubjective nature of vision, it seems, has conspired to hide it from us. It becomes the tacit ground against which is projected an explicit image of vision as the sight of things.

Blind people, of course, cannot see things any more than they can see faces. But they can listen to them. Blind participants in a study conducted by Miriam Hill reported listening to mailboxes, signs, openings, doors, posts, poles and trees, as well as 'the sounds that bounce off buildings' (Hill 1985: 102). The ability to perceive objects in this way, beyond the reach of touch, seems to be based on a principle of echolocation. Just as for the sighted, recalling Gibson's argument, the presence and forms of environmental objects are revealed through modulations in the array of reflected light reaching the eyes of a moving observer, so for the blind they are revealed through modulations in the array of reflected sound. Yet it is not only the ears that are at work in this process. 'What the blind person experiences in the presence of an object', as Lusseyran explains, 'is pressure' (cited in Hill 1985: 107). Hull reports on precisely the same experience, describing the pressure as sometimes so intense that one instinctively wants to put up a hand to the face to protect oneself.

> One shrinks from whatever it is. It seems to be characterised by a certain stillness in the atmosphere. Where one should perceive the movement of air and a certain openness, somehow one becomes aware of a stillness, an intensity instead of an emptiness, a sense of vague solidity.
>
> (Hull 1997: 23)

For the blind actor-musician Tom Sullivan, it seemed that he could feel, on his face, waves of air that had been pushed away by the body during movement and returned at an angle from some obstacle (Sullivan and Gill 1975: 68). He called this 'facial vision'. Not surprisingly, it does not work well in windy weather (Hill 1985: 103).

There is some doubt, then, as to whether facial vision is a form of hearing or of touch: indeed the phenomenon raises in a peculiarly acute form the problem of the distinction between these sensory modalities. Hull claims that 'the sense of pressure is upon the skin of the face, rather than upon or within the ears' (1997: 24). Elsewhere he describes the sensation of being in an empty building as one that goes beyond mere hearing; 'there must be a certain sensitivity of the entire body to vibrations and to air pressure as well as to inaudible echoes' (p. 85). Evidently the same vibrations which, as they excite the membrane of the ear, are discerned as sound can also excite receptors distributed over the skin, but are then discerned as 'pressure'. Paul Rodaway (1994: 50) regards facial vision as a form of 'global touch', by which he means the body's general contact with the environment, across all its surfaces. But as he points out, it could just as well be described as a subtle form of auditory perception. The implication, that we hear not just with the ears but with the whole body, is, as we shall see in a moment, of great significance for understanding the sensory experience of the deaf. For the present, I should like to conclude my discussion of the experience of blindness with three points.

First, the clear distinction that sighted people are inclined to make between touch and hearing may in fact be a *consequence* of vision, and of the precise delineation of tangible surfaces, at the interface between solid objects and the surrounding medium, that it affords. This may be why the multimodal feeling-hearing of the blind, which is neither touch, echo, nor motion but a blending of all of these, may be so hard for the sighted to grasp (Hill 1985: 104). Secondly, the commonplace supposition that vision is inherently spatial and hearing inherently temporal needs to be qualified. Through the principle of echolocation, hearing *can* disclose a world of stable forms – of things in their places – just as vision can. And while it is true that such disclosure depends upon the perceiver's motion relative to the perceived, the same is equally true of vision (Rodaway 1994: 124–5). In essence, both looking and listening are aspects of a movement that, being generative of both space and time, is ontologically prior to any opposition we might draw between them. Thirdly, it seems probable that even sighted people, albeit unawares, are significantly guided by echolocation or 'facial vision' (Ihde 1976: 67–70). They simply do not pay any attention to it. As Rée writes, for all of us 'becoming acquainted with buildings or landscapes is partly a matter of getting to know their acoustic profiles – listening to the sounds they produce and the echoes they give back' (1999: 53). To be at home in a place, especially in the dark, means knowing how it sounds and resounds.[21] Thus listening is just as much a means of active inquiry and of orienting oneself in the world as is looking.

Being deaf

Turning now to the experience of the deaf, there are two aspects of what Wright aptly calls 'deafmanship' (1990: 113) on which I want to focus. For the first, I return to the point that we hear with the whole body, in order to bring out the range of auditory experience even for people who, like Wright himself, have no use of the ears whatever. Secondly, I refer to the sign language of the deaf, in order to show that the contrast between hearing and vision as sensory modalities of verbal communication is far less fundamental than is commonly supposed. On the first point, and judging from Wright's autobiographical account, it seems that deafness is never absolute in the way that blindness can be (Wright 1990: 9, see Ihde 1976: 45, Rée 1999: 36–7). This is because what we experience as sound is caused by vibrations in surrounding media and surfaces, to which the ears are not alone in responding. Standing on a resonant surface such as wooden floorboards, one can 'hear' approaching footsteps through the feet. But one cannot do this if the surface is, say, of stone or concrete. In speech, one hears the sound of one's own voice, in part, through an internal conduction of vibrations set up in the bones of the head. Insofar as these vibrations bypass the mechanism of the ear, they may still be sensed by a speaker who is deaf. In addition, deaf people can judge the quality of their voice by placing a finger to their neck, at the location of the larynx, and they can likewise 'hear' the sound of a musical instrument, radio or record player by touching the sound box or amplifier (Rée 1999: 36).

But in these instances of 'touch-hearing', what is heard is nothing like the complete sound as it would be experienced by a listener whose ears are functioning normally. Much depends on the particular resonant properties of the surfaces with which one comes into contact, principally through the hands and feet. As a rule, however, the sound 'comes across as a blurred bumble of noise' (Wright 1990: 9). Timbre and pitch are indeterminate, but there is an overwhelming concentration on frequencies at the lower end of the spectrum. The sounds that can be 'heard' at these frequencies tend to be abrupt and

percussive, like explosions or the noise of heavy machinery. Since they cannot be placed within the finely differentiated acoustic field of background and foreground sounds such as is revealed by the ears, it is hard to pin them down to specific sources or locations. They tend, rather, to appear and disappear, suddenly and without warning. Moreover low-frequency external noise, picked up through bodily vibration, is easily confused with that generated internally in the course of normal metabolic and respiratory processes – of the kind that the doctor can 'hear' by means of a stethoscope (Rodaway 1994: 100–1, Rée 1999: 53–4).

Besides this touch-hearing, however, Wright reports on another kind of experience of sound, registered not through feeling but through *sight*. Only where nothing moves, as on a perfectly calm day, does the world appear to be shrouded in total silence. Upon the slightest movement, this silence is shattered. I have already referred to such experience as an instance of the 'sight of sound', exemplified in Wright's observation that 'birds, flying, sing with wings instead' (1990: 3, 11–12). Yet he admits that this 'visionary noise', unlike the palpable sensations of touch-hearing, is actually a thing of the imagination. It does not really exist. I have to say that I am not convinced by the implied distinction between real and imaginary sound. For even the sounds that people with normal hearing routinely describe as real are no less phenomena of lived experience, and it is perfectly clear from Wright's description of vision-hearing that the sounds he sees are, for him, every bit as vivid as are the sounds that other people hear, for them. Wright himself wonders whether his eye for sound may owe something to unconscious childhood memories, for deafness did not strike him until the age of seven. He recalls that at the time, he did not notice he was deaf, and only gradually became aware of his condition on account of his inability to pick up the sounds of unobservable movements like the ticking of a clock (1990: 22, see Rée 1999: 37). In the case of visible movements, the fact that his ears had ceased to function made no perceptible difference, at least at first, to what he heard. This surely furnishes compelling evidence for the view that even for the aurally unimpaired, hearing is critically guided by the 'antennae' of sight. And it fits with Hull's observation that when people go blind, their hearing does not improve but rather deteriorates (Hull 1997: 117).

Now when people are speaking to one another, the movements of their speech may be visible in the face, and especially the lips. This is the basis for the skill of lip-reading. It is normal, too, for speech to be accompanied, and amplified in its expressive force, by visible gestures of the hands. In communities of the deaf, gestural systems have been elaborated to the point of constituting languages in their own right, fully commensurate with spoken ones. These are conventionally known as signed languages (Armstrong, Stokoe and Wilcox 1995). Neither speech nor sign has quite the intimacy of eye-to-eye contact, since in both cases there is a functional differentiation, within the overall bodily system of perception and action, between the organs of sense and motion. In speech the division is between the ears and the voice; in sign it is between the eyes and hands. But as speech and sign are formally equivalent in this regard, the possibilities of establishing a direct, mutual involvement of self and other through sign must be just as great as they are through speech. This is the point at which to remind ourselves of what McLuhan, Ong and their followers have to say about the properties of thought and expression in the oral-aural modality. For setting aside the likelihood of deaf signers' familiarity with the written word, there seems no good reason to doubt that these properties should be attributable to the manual-visual modality as well.

Recall that for Ong, people in a primarily oral culture hear words not as things, as though they were looking at them, but as sound. Similarly for deaf signers, gestures are

movements to be watched, not objects to be looked at (Armstrong, Stokoe and Wilcox 1995: 83–4). There is no holding them still for inspection. Like speech sounds, signed gestures exist only in their passing. The fact that they are seen and not heard makes them no less fleeting, no more thing-like, than spoken sounds. Moreover the movements of the hands in gesture respond to visually perceptible movements in the signer's surroundings much as, in the oral context, speech sounds resonate to the properties of the acoustic environment, yielding the 'gestural iconism' that is such a pronounced feature of the signed language of the deaf – the precise counterpart of the phonological iconism in the speech of supposedly 'auditory' cultures such as the Umeda (Gell 1995: 247–8). Taking all these parallels into account, we can only come to the same conclusion as Jonathan Rée, in his study of the history of deaf education. 'The idea that there is a metaphysical gulf dividing communication by visible gestures from communication by audible words', he writes, 'is a fantasy without foundation, a hallucination rather than a theory' (Rée 1999: 323–4).

McLuhan and Ong, of course, were above all concerned to contrast the properties of speech and *writing*. Their mistake, as should now have become clear, was to imagine that these contrasting properties could be deduced from the differences between hearing and vision. The critical feature of writing, by which it is distinguished from both sign and speech, is that it is inscribed upon a durable surface. Is it, then, their inscription, and not just their visibility, that renders words as things? Not exactly, for the perception of inscriptions as objects depends upon a still more limited set of conditions. The trace of a gesture, such as the calligrapher's brush stroke, may be apprehended as a movement in just the same way as the gesture itself. In this, the reader's eye follows the trace as it would follow the trajectory of the hand that made it. The written word is perceived as a thing only when it is read not as the *trace* of a visible gesture but as the *representation* of a vocal one. Thus, lurking behind the argument that writing leads us to see words as 'quiescent objects' (Ong 1982: 91) lies an assumption, still widespread even among linguists, that the only proper languages are spoken languages, and therefore that writing exists for the sole purpose of representing the sounds of speech. This phonocentric assumption betrays a deep-seated and obstinately persistent prejudice to the effect that manual signing is an imperfect form of communication that scarcely qualifies as 'language' at all.[22] And it is precisely this disqualification of gesture from language proper that has given rise to the idea that language can be made visible in no other way than through the representation of speech in writing.

The interchangeability of visual and auditory perception

In conversation with Georges Charbonnier, the painter André Marchand describes his perception of the visible world as one in which he is already submerged, and which opens up to him, as it were, on the inside:

> For example, in a forest, I have felt many times that it was not I who was looking at the forest. On some days I have felt that it was the trees that were looking at me, that were speaking to me. For myself, I was there . . . listening.[23]
>
> (Charbonnier 1959: 143)

This experience is surely familiar to anyone who has wandered in the woods. There are two aspects of it to which I want to draw attention. First, it lends compelling support to the idea of the reciprocity of vision, to which I have already alluded in connection with

the ordeals of blindness. Unable to see, the blind person becomes convinced of his own invisibility, as though his very existence were thrown into question. Conversely, to 'be there', to have a presence in the world, and so to be able to see, is to exist in the sight of others. Thus we feel that the trees around us have eyes and are looking at us, for if they were not, where would *we* be? Secondly, notice how readily Marchand slips from the language of sight to that of sound. The trees look, but they may as well be speaking; we watch, but we might as well be listening. It is to this interchangeability of visual and auditory perception that I now wish to turn.

I begin with a musicological example, which takes us back to Zuckerkandl's question of whether it is preferable to listen to music with the eyes open or closed. In his autobiography, the composer Igor Stravinsky argues passionately for the former view. 'I have always had a horror', he writes, 'of listening to music with my eyes shut, with nothing for them to do. The sight of the gestures and movements of the various parts of the body producing the music is fundamentally necessary if it is to be grasped in all its fullness' (Stravinsky 1936: 72). Watching the movements of the drummer, the violinist or the trombonist gives shape and direction to our hearing, which would otherwise be empty and aimless. We hear less well with the eyes closed, according to Stravinsky (and as Hull also found with the onset of his blindness), since we lose this visual steering of auditory perception. Cut loose from the bodily movement of its production, musical sound appears abstract and incorporeal. It has often been remarked of hearing that it is a passive sense, that all it can do is succumb to imperatives issuing from the outside world. Jonas, for example, maintains that 'in hearing, the percipient is at the mercy of environmental action' (1966: 139), while for Adorno, hearing appears 'dozy and inert' (1981: 100). It is just this kind of passive hearing, as 'mere supine susceptibility' (Rée 1999: 53), that Stravinsky attributes to those who like to listen to music with their eyes shut. Such people, as he caustically remarks, far from listening to the music itself, prefer to 'abandon themselves to the reveries induced by the lullaby of its sounds' (1936: 73). They allow the sound to wash over them – or to 'float through experience', as Ihde (1976: 78) puts it – oblivious to the fact that it is being produced by players with instruments. Once we open our eyes, however, we cease to be mere consumers of sound, and join silently in the process of its production. Hearing is roused from its slumber, and becomes active and engaged.

This leads us to a conclusion of paramount importance. If hearing is a mode of participatory engagement with the environment, it is not because it is opposed in this regard to vision, but because we 'hear' with the eyes as well as the ears. In other words, *it is the very incorporation of vision into the process of auditory perception that transforms passive hearing into active listening.* But the converse also applies: it is the incorporation of audition into the process of visual perception that converts passive spectating into active looking or watching. That is why Marchand found that in looking at the trees – which were also looking at him – he was also silently listening to them. He was 'looking' with the ears as well as the eyes. Marchand's experience would be entirely familiar to the Koyukon people, who follow a life of hunting, trapping and fishing in the forests of Alaska. They 'live in a world that watches', according to their ethnographer Richard Nelson, 'in a forest of eyes' (1983: 14). But it is a forest of ears as well. The principal trees of the forest, namely spruce and birch, as well as many of its diverse animal inhabitants, are invested with spirits which, like people, can hear as well as see. That is why, for the Koyukon, it is always important to be careful in what you say, so as not to cause any offence. They see because you see; they hear because you hear. But whether on the side of people or spirits, it is the element of auditory attention that converts vision into watchfulness.

Among the Yup'ik Eskimos, too, there was a similar awareness that people are constantly under the watchful scrutiny of spirits. The cosmos itself (*ella*) – sentient, knowing and responsive – was conceived as an immense eye, but it was one that could hear as well as see. It could also smell. Thus for their own and everyone else's safety, mourners and menstruating women were subject to restrictions such that they 'remained odorless, inaudible, immobile, and invisible to the eye of *ella*' (Fienup-Riordan 1994: 248). The knowledge that the eye of *ella* was watching, and that human activities were visible to the spirit world, controlled every aspect of everyday Yup'ik life. To witness a spirit directly was to see it as a *face* which, like the cosmos itself, was circular in form and centred on the eyes. However the face was not a mask covering over the *persona* of the spirit, and through which its voice could be heard. To the contrary, the face would be revealed through a process of unmasking akin to the retraction of a hood – a dissembling of outward appearance as given to ordinary, quotidian vision so as to uncover the being within. To encounter another person 'face-to-face' was not, therefore, to be set over against them, as in the image of the *vis-à-vis*, but to be enveloped in the intense, intersubjective intimacy of eye-to-eye contact. Unmasked, the eyes of the spirit would literally catch the glance of the beholder in their sight. But this implies that as an aspect of being, the face is as much on the 'inside' as is the voice. If the voice is the sound of being, then the face is its look.[24] And hence, too, to listen to another person, whether human or spirit, is equivalent to looking at them. As one Yup'ik man explained: 'A speaker will not scold you for looking at him too much. But looking all the time while someone is teaching, that is how one must keep listening' (Joe Beaver, in Fienup-Riordan 1994: 316). To this, Fienup-Riordan adds that 'watching a person's face . . . was particularly revealing'.

Some sort of distinction is nevertheless entailed, here, between two kinds – or levels – of vision: on the one hand, the ordinary sight of pre-existing things that comes from moving around in the environment and detecting patterns in the ambient light reflected off its outer surfaces; on the other hand, the revelatory sight experienced at those moments when the world opens up to the perceiver, as though he or she were caught up in the movement of its birth. This distinction is effectively equivalent to the one I introduced earlier, in comparing the theories of visual perception of Gibson and Merleau-Ponty, between vision as a mode of *participation* and as a mode of *being*. In neither case can vision be radically separated from hearing. In the former, as I have shown, it is the co-option of hearing by vision that turns merely contemplative seeing into active looking or watching. In the latter, our inquiry into the convergences between what Merleau-Ponty and Zuckerkandl have to say, respectively, about the painterly apprehension of light and the musical apprehension of sound, showed that they were, in principle, all but indistinguishable. To illustrate the contrast between these two levels of vision, and the different relations with hearing involved in each, I turn briefly to another example.

Earlier, I told of how I know the cuckoo by its sound, and that only through being seen does it come to be perceived as a thing that makes a sound. Among the Ojibwa, indigenous hunters and trappers of the Canadian North, there is said to be a bird whose sound, as it swoops across the sky, is a peal of thunder. Few have seen it, and those who have are credited with exceptional powers of revelatory vision (Hallowell 1960: 32; see Chapter Six, pp. 92–3, 99, for a more detailed account based on Hallowell's ethnography). What is the difference, then, between seeing a cuckoo and seeing a thunderbird? Birdwatchers would surely be among the first to recognise the importance of hearing to active, exploratory vision. Listening out for birdsong and other sounds – the beating of wings, or the rustling of leaves – the watcher's sight homes in on the source from which

these sounds issue. Thus the organs of hearing constitute an auditory guidance system that serves to orient vision towards its target. The enigma of the call, *cuc-koo*, emanating from somewhere in the trees, is resolved as soon as we spot the bird that is producing it. Naming the bird by the sound of its call, we regard it as just another individual of a species, a living thing, whose presence and activity, moreover, are unaffected by the watcher's neutralising gaze.

The thunderbird, by contrast, is not a thing of any kind. Like the sound of thunder, it is a phenomenon of experience. Though it is by thunder that the bird makes its presence heard, this sound is not *produced* by the thunderbird as the cuckoo produces its call. For the thunder *is* the bird, in its sonic incarnation. Therefore to see it is not to resolve the cosmic mystery of the sound, as though one could take a step back from one's involvement in the world and say 'Oh, so that's where it's coming from!' One is rather drawn further in. The bird presents itself to vision as an experience of light in just the same way that it presents itself to hearing as an experience of sound. If sound, here, is intrinsic to sight, this is not because it guides vision towards its object but because *hearing is seeing*. As a specific form of the experience of light, the thunderbird is not set over against the perceiver as an object of vision, but invades the perceiver's consciousness, whence it is generative of his or her own capacity to see. Much the same could be said of the experience of sunlight or moonlight, and indeed the sun and moon are apprehended by the Ojibwa, along with the thunderbird, as beings of similar kind. They are, in short, not so much visible things as manifestations of light.

Whereas in Western society such revelatory vision is the province of the painter, in many non-Western societies it is closely associated with the activities of the shaman. The metamorphosis of sound into light and vice versa – that is, hearing with the eyes and seeing with the ears – is peculiarly characteristic of shamanic practice. A fascinating example of this phenomenon has been documented among the Shipibo-Conibo Indians of eastern Peru by Angelika Gebhart-Sayer (1985). In a ritual of healing the shaman, suitably entranced, becomes conscious of an aura of radiant light that seems to float towards him, covering the surfaces on which it falls with elaborately reticulate, geometric designs. Where they touch his lips, these luminescent designs are at once converted into melodious song. The shaman sings along with his attendant spirits, and other villagers (who hear only the shaman's voice) join in, following his example. As the combined voices are wafted through the air, they turn once more (though only in the shaman's sight) into designs that penetrate the patient's body and settle there, becoming ever clearer as the cure proceeds (Gebhart-Sayer 1985: 162–4). The shaman's songs, as Gebhart-Sayer puts it, 'can be heard in a visual way, . . . and the geometric designs may be seen acoustically' (p. 170).

The designs themselves are of extraordinary intricacy, and were once recorded on cotton fabric sheets bound into 'books' – leading to speculation that the Indians in this region might have possessed a form of hieroglyphic writing. None of these books survive today, but the villagers among whom Gebhart-Sayer carried out her fieldwork recalled that an old man from a nearby village, the son-in-law of a shaman, had kept a school exercise book whose pages were filled with minute red and black patterns. One woman remembered how, as a child, she had managed secretly to get hold of the book and to copy four of the designs before being caught and scolded by her grandmother. She claimed never to have forgotten them, and was able to redraw them from memory (Gebhart-Sayer 1985: 155). One of her drawings is reproduced in Figure 14.2. It is not hard to see why European observers should have been moved to compare such graphs to writing. It seems, on the face of it, that the Shipibo-Conibo shaman apprehends the sounds of song in much the
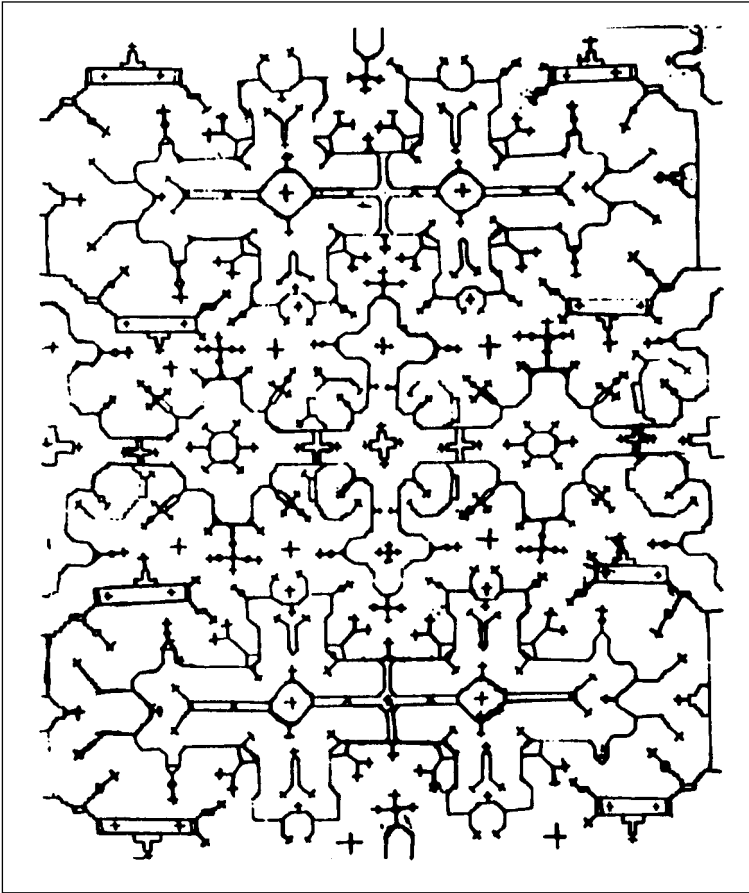
Figure 14.2 One of the designs from the sacred book of a Shipibo-Conibo shaman, drawn from memory by a woman from the village of Caimito in 1981.

Reproduced from A. Gebhart-Sayer, The Geometric Designs of the Shipibo-Conibo in Ritual Context, *Journal of Latin American Lore*, 11: 2, 1985, p. 158.

same way that people in the literate West are supposed to apprehend the sounds of speech – that is, as if they were looking at them. The geometric design lodged in the shaman's vision bears an uncanny resemblance to the Saussurian 'sound-image'. And if the written word is a transcription of the image from the mind onto paper, could not the same be said of the graphic designs in the shaman's 'books'?

It is true that in a sense, the Indian shaman 'sees' songs, and that in another sense, people raised in the Western tradition of print literacy 'see' spoken words. But the senses of seeing adduced in these two instances could not be more different. This difference corresponds, rather precisely, to the way in which Western thinkers have conventionally distinguished vision from hearing. To recall Zuckerkandl's formulation, it is the difference between the experience of a world 'out there', and that of a world coming 'from-out-there-toward-me-and-through-me' (Zuckerkandl 1956: 368). For the Westerner to see words is to apprehend them as things, exterior objects to be grasped by way of the

images or representations that are formed of them in the mind. The shaman's vision, by contrast, is not a seeing of things but an experience of light, which is felt to be streaming towards him and into him. As it does so it turns to sound. It is at the interface where inflowing light is converted into outflowing sound that the designs are generated in his perception. In the healing ritual, this conversion takes place upon the shaman's lips. Thus where the design is inscribed upon a surface, such as cotton fabric or paper, that surface is transformed into an interface of the same kind as the lips. This immediately makes sense of native claims to the effect that the surface, with its designs, speaks directly to the person who 'reads' it (Gebhart-Sayer 1985: 154).

If this is indeed reading, then it is more akin to lip-reading than to the reading of the written word. In the graphic traces on the page of the shaman's book the voice is rendered visible, just as it is, for the deaf lip-reader, in the movements of the speaker's lips and face. As the eye of the beholder follows the traces, his lips move to pronounce the corresponding sounds. This interpretation is corroborated by Peter Gow, in a study of reading and writing among another native people of the Peruvian Amazon, the Piro. The study focuses on the story of one man, Sangama, reputed to be the 'first Piro who could read'. According to the story, told in the 1940s by his younger cousin Zumaeta, Sangama used to pick up printed books and newspapers and read them, 'his eyes following the letters and his mouth moving' (Gow 1990: 91). What he saw, however, were not words on paper. He saw the paper itself as the red painted lips of a woman, speaking to him. And he was convinced that this was what his European bosses saw when they read their newspapers: 'When the white, our patron, sees a paper, he holds it up all day long, and she [the paper] talks to him … The white does that every day' (in Gow 1990: 92–3). If Europeans were predisposed to treat Indian designs as an instance of writing, what could be more natural than for the Indian, Sangama, to treat the printed texts of European books and newspapers as instances of design? Sangama's claim to be able to read, as Gow shows, was based on his understanding of shamanic practice. In accord with this understanding, he approached the graphs on the page not as 'representations' or 'symbols' of vocal sounds, but as the voice itself, shining forth as a pattern of light. It is probably along these lines, too, that we should interpret Seeger's observation that among the Suyá, another Amazonian people, visual designs such as weaving patterns are seen acoustically. On learning such a design, they say 'It is in my ear' (Seeger 1975: 214).

THE ANTHROPOLOGY OF THE SENSES: A SECOND CRITIQUE

We can now pick up the threads of my critique of the anthropology of the senses, from where I left off earlier in this chapter. The common flaw, running through all the work in this field that I have reviewed so far, lies in its naturalisation of the properties of seeing, hearing and other sensory modalities, leading to the mistaken belief that differences between cultures in the ways people perceive the world around them may be attributed to the relative balance, in each, of a certain sense or senses over others. Thus it is supposed that where vision predominates, people will apprehend the world in one way, and where hearing predominates they will apprehend it in another. This approach is exemplified in the work of David Howes, who formulates the key question in the anthropology of the senses as follows: 'What is the world like to a culture that takes actuality in less visual, more auditory or olfactory, gustatory or tactile terms than those to which we are accustomed?' (Howes 1991a: 6). By 'we' he means people of modern Western societies, steeped in a hyper-visual aesthetic that turns the world into a spectacle laid out before the 'detached

and observing eye' (Romanyshyn 1989: 31). As an antidote to this kind of spectacular vision, epitomised by the representational techniques of linear perspective, Howes invites us to consider the graphic designs of the Shipibo-Conibo Indians, such as the one reproduced in Figure 14.2. Unlike the perspective drawing where everything is geometrically fixed in its proper place, these designs, he says, fairly *pulsate* (Howes 1991a: 5).

What is the explanation for this contrast? Why should the impact of Shipibo-Conibo shamanic designs be so very different from that of the drawings of Renaissance draftsmen? For Howes the answer lies in the 'pluri-sensorial' quality of the Shipibo-Conibo aesthetic, as against the 'almost exclusively visual' aesthetic of the West. He seems to think that vision is an inherently objectifying sense, that it naturally sets things off at a distance from the observer, but that these distancing effects can be counteracted by adding liberal doses of non-visual experience to the sensory mix. Thus in shamanic healing, the luminescent designs mingle with songs and fragrances to bring about a cure, whereas in the viewing of Renaissance art sounds and smells are screened out, leading to a stultification of the non-visual senses and a corresponding stepping up of 'the natural power of the eye to survey things from afar' (Howes 1991a: 5–6). This is hardly a convincing argument, however. For one thing, it is no more in the nature of the eye that it should function as an instrument of detached speculation than that it should open the seer to experiences of the most intimate revelation. Besides, it is simply not the case that people in Western societies exercise their powers of sight in an environment sheltered from acoustic and olfactory stimuli. Certainly, the sight of designs moves the Shipibo-Conibo shaman to song, and the odours of selected plants form an important part of the ambience of the healing ritual (Gebhart-Sayer 1985: 171–2). Yet who would deny the power of fragrance and song, alongside visual images of sacred significance, in the Catholic Mass? The aesthetic experience of the Western church-goer is surely just as 'pluri-sensorial' as that of the participant in a Shipibo-Conibo ceremony. Adding more sounds and smells will not make any difference to the way he or she sees.

If the centrality that the Western tradition accords to the eye were due to nothing more than an inattention to hearing, along with touch, taste and smell, then it could be easily corrected. So far as hearing is concerned, we would have only to speak up in praise of sound – which, in itself, would be no bad thing (Ihde 1976: 9). But as Ihde points out, the situation is complicated by the fact that the reduction *to* vision, in the West, has been accompanied by a second reduction, namely the reduction *of* vision. One cannot escape this reduction, inherent in the rhetoric of visualism, simply by erecting an antivisualism in its place (Ihde 1976: 21, see Feld 1996: 96). For its source lies not in any bias towards the eye over other organs of sense, but in what Johannes Fabian (1983: 123) calls a particular 'cognitive style' – one that is likely to prejudice our understanding of all kinds of perceptual experience, whether predominantly visual or not. It is in this style, rather than in anything to do with the ratio of the senses, that we find the answer to our question of how Renaissance drawing differs in its impact from Shipibo-Conibo design. Incorporated into Western techniques of depiction, it leads us to equate vision with visualisation – that is with the formation, in the mind, of images or representations of the world. Incorporated into techniques of anthropological analysis, however, this very same cognitive style is what leads us to regard the process whereby people 'make sense' of their world as a cultural construction of reality.

At the heart of this approach is a representationalist theory of knowledge, according to which people draw on the raw material of bodily sensation to build up an internal picture of what the world 'out there' is like, on the basis of models or schemata received through their education in a particular tradition. The theory rests on a fundamental distinction

between physical and cultural dimensions of perception, the former having to do with the registration of sensations by the body and brain, the latter with the construction of representations in the mind. And despite vigorous protestations to the contrary (Howes 1991b: 169–70), the anthropology of the senses remains fully committed to this version of Cartesian mind/body dualism. It turns out that it is not, after all, concerned with the varieties of sensory experience, generated in the course of people's practical, bodily engagement with the world around them, but with how this experience is ordered and made meaningful within the concepts and categories of their culture. Moreover the same logic that divides bodily sensation from mental representation, as a physical rather than a cultural fact, also reifies the senses as aspects of a universal human nature. In its movements and responses, such as in looking, listening and touching, the body may furnish symbolic resources for projects of cultural cognition, but it is not from these bodily processes themselves that culture springs. In short, to adopt a useful distinction from Csordas (1990: 40 fn. 2), the body with its various senses is taken to comprise the cognitive rather than the existential ground of culture (see also Chapter Nine, pp. 169–70).

This position is exemplified by Constance Classen, in her book *Worlds of Sense* (1993). Her concern here is quite explicitly with the expressive rather than the practical significance of sensory experience – that is, with the ways in which such experience may be selected, metaphorically, to 'stand for' the central concepts and values of a culture. These values and concepts add up to what she calls the *sensory model*. Thus Western culture, for example, has fastened on the experience of vision to signify the value of objective knowledge. In another culture, with a different sensory model, core values might be expressed through metaphors of hearing, or touch. This is what Classen means by the cultural 'shaping', or 'conditioning', of perception. 'Sensory models', as she insists, 'are cultural models, and sensory values are cultural values'. But just because here vision, or there touch or hearing, have been singled out as vehicles for symbolic elaboration, this does not mean that people will see, hear or touch any differently in consequence. Whether the mode of engagement with the environment of greatest practical importance to people is looking, listening, or touching, or some amalgam of these, is immaterial. What is important, so far as the 'cross-cultural exploration of sensory orders' is concerned, is that the meanings and understandings of the world gained through perceptual activity are *expressed symbolically* by way of metaphors drawn from one or another domain of sensory experience (1993: 135–7, see also Classen 1997).

The same objectification of the bodily experiences of looking, listening and touching, and their conversion into metaphorical resources for the expression of extra-somatic, cultural values, is also evident in the work of Howes. To his credit, Howes does recognise that human beings are not simply endowed by nature with ready-made powers of perception, but that these powers are rather cultivated, like any skill, through practice and training in an environment. For this reason they can vary from one individual to another, even within a single society. The musician, for example, may develop a fine sense of hearing, and the chef an equally subtle sense of taste, even though both may belong – as they do in the West – to a society that is inclined to describe the knowledge and judgement of each through metaphors of sight. We could even expect that these variations of sensory skill would be manifested neurophysiologically in the differential development of the cerebral cortex, such that were we to map the surface of the human body on a scale that varies in proportion to the space that each region takes up in the cortex, the resulting figure – known as the 'sensory homunculus' (see Figure 14.3) – would differ, say, from the musician to the chef, reflecting their contrasting 'sensory profiles'.[25] For Howes,
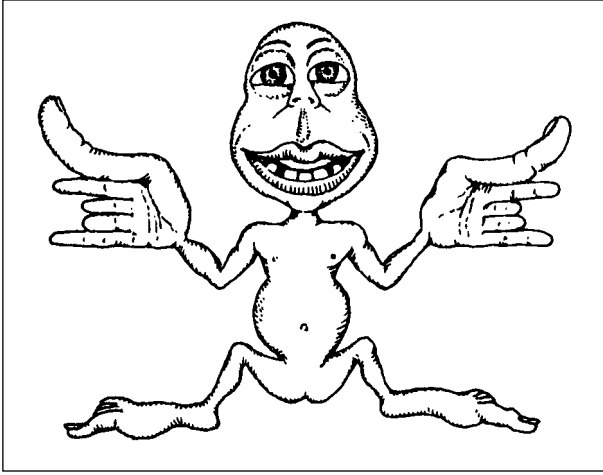
Figure 14.3 The sensory homunculus, an illustration of how the surface of the body is represented in the somatosensory cortex. Larger areas of the cortex are devoted to the more sensitive parts of the body, such as the fingers and lips.

however, these individual variations in practical, perceptual ability are simply irrelevant. He wants to show how the 'map of the senses' differs, not between individuals, but between whole cultures or societies (Howes 1991b: 168–9).

The effect of this move is to uphold a notion of cultures as consisting in systems of collective representations, over and above the conditions and contexts of practical life within which people develop and embody their own skills of action and perception. Howes sets out his position on the matter as follows:

Differences among individuals (by age, sex, occupation, or temperament) only take on meaning against the background of the culture to which they belong. It is the sense in which *whole* societies can be classified as more tasteful than others, . . . or more aurally than visually minded, . . . that is of primary interest to the 'anthropology of the senses'.

(1991b: 168, original emphasis)

In an 'aurally minded' society, for example, people would express their ideas of knowledge or understanding by drawing on metaphors from the realm of acoustic experience. Where we, in our 'visually minded' society, say 'I see what you mean', they might say 'I hear what you mean'. But this implies nothing about the relative development of their powers of hearing or seeing. Thus Howes is fatally confused in supposing that what he envisages as a 'cultural map of the senses' is merely a scaled-up version of the sensory homunculus (1991b: 168–9). For as the level of analysis shifts from the individual to society as a whole, so the domain that is 'mapped' is no longer of bodily but of conceptual space. Instead of tracing a set metonymical connections between the sense organs and regions of the brain, the 'cultural map' establishes a system of metaphorical correspondences between the material realm of sensory experience and the ideal realm of mental representations. To grasp the logic of this, one has only to substitute a 'plane of sense' for the 'plane of sound' in Saussure's depiction of language (see Figure 14.1).

Like the earlier anthropology of the body (see Jackson 1989: 123; Chapter Nine, pp. 169–70), the anthropology of the senses – as presented in the work of scholars such as Howes and Classen – seems determined to leave lived, sensory experience behind in the search for what it stands for, namely the incorporeal 'ideas' and 'beliefs' of a culture. Far from helping us to understand how the whole body perceives, and how meaning is generated within the contexts of its activities of looking, listening and so on, this approach reduces the body to a locus of objectified and enumerable senses whose one and only role is to carry the semantic load projected onto them by a collective, supersensory subject – namely society – and whose balance or ratio may be calculated according to the proportion of the load borne by each.[26] Now in criticising this approach, I do not intend to downplay the importance of examining the ways in which sensory metaphors are mobilised in

discourse. The fact that we say 'I see what you mean' is surely significant. But in resorting to this figure of speech, I am not expressing one thing, a concept of understanding, in terms of another, a specific objectification of the bodily sensation of sight. I am rather inviting you to compare the experience of unison arising from our mutual engagement in verbal dialogue to the experience, with which both you and I are familiar, of unison between perceiver and perceived in the activity of watching or looking. But what if you were *not* familiar with the latter experience? What if you were blind?

For Howes and Classen, whether or not you can actually see, or just how one's sensory capacities are practically deployed in activities of perception, is beside the point so far as the sensory characterisation of a whole society is concerned. These are merely questions of individual idiosyncrasy. Fieldwork among the 'aurally minded', in a society which has elected to articulate its core values by means of metaphors of hearing, will not tell us anything about the experience of the blind. But as Hull shows, in a meditation upon the blind person's response to the expresssion 'I see what you mean', matters are not that simple. Should he refrain from using the expression? That, Hull remarks, would be absurd. To opt out of the verbal conventions of one's society would be to compound one disability with another. Yet he cannot avoid the fact that the expression, which invites comparison between his understanding and a form of perceptual experience which he does not share with his interlocutors, does not have quite the same resonance for him as it has for them. There is, he says, 'a subtle shift in the whole character of communication between sighted and blind people' (Hull 1997: 26).

The lesson to be learned from this is that the verbal conventions of a society do not come ready-made, nor are they simply superimposed upon the experience of its members so as to 'make sense' of it. Rather, they are continually being forged and reforged in the course of people's efforts to make themselves understood – that is to 'make sense' of *themselves* to others. They do this by drawing comparisons between their own sensory practices and experiences and those attributable to their fellows. I suppose you are familiar, as I am, with the sound of thunder and the sight of lightning. I want you to understand what it felt like when I stood by the railway tracks as the train passed by. 'It thundered past me', I say, 'in a flash'. But in having recourse to this metaphor, it is my *experience* that I want to convey to you, not some conceptual prototype of a 'passing train' for which the auditory and visual sensations of thunder and lightning happen to provide apt vehicles of symbolic expression. Instead of abandoning the lived experience of individuals for the collective sensory consciousness of society, it is surely to this creative interweaving of experience in discourse, and to the ways in which the resulting discursive constructions in turn affect people's perceptions of the world around them, that an anthropology of the senses should primarily direct its attention. 'Making sense', in short, lies not in the subjection of human nature to social conditioning (Classen 1993: 5), but in the involvement of whole persons with one another, and with their environment, in the ongoing process of social life.

Epilogue

Martin Jay closes his monumental study of attitudes to vision in the recent history of Western thought, above all in the Francophone tradition of scholarship, with the following words:

> The trip began by acknowledging . . . how ineluctible . . . is the modality of the visible, not merely as perceptual experience, but also as cultural trope. It thus seemed fruitful

> to follow the unfolding of a loose discourse about visuality, rather than to try to document actual transformations in sensual practices.
>
> <div align="right">(Jay 1993a: 587)</div>

If there is one, principal conclusion to be drawn from my critique of the anthropology of the senses, it is that any attempt to separate out the discourse surrounding vision from the actual practices of looking, watching and seeing is unsustainable. The same, indeed, goes for any other sensory modality. For what is discourse, if not a narrative interweaving of experience born of practical, perceptual activity? The meanings to which it gives rise, as I have shown, are not added 'on top' of lived, bodily experience, but lie in the ways in which the strands of this experience are woven together. Historians of philosophy are surely deceiving themselves in imagining that what has been thought and written *in terms* of the senses can be neatly partitioned off from what has been lived and felt *through* them. As Rée says, 'the historical development of philosophy will never make much sense if it is treated as a bloodless struggle between great books, with all the local flavours, fragrances, noises, temperatures, and colours of ordinary experience left out' (1999: 383).

Indeed the conceit of the philosopher who would write a history of vision without regard to how people actually see mirrors that of the physicist who would construct an optics that makes no reference to the eye. Both, in effect, reproduce a dichotomy between mind and nature, within which all knowledge takes the form of representations of reality. It is through its assimilation to this framework that vision has come to be characterised, by admirers and detractors alike, as having a natural propensity to turn whatever it encounters into objective 'things', to be grasped dispassionately from a distance (Levin 1988: 98). And having been cast in this role, as either the hero or the villain of the drama of modernity, any tendency towards imagining the world as a domain of exterior objects, to be seized by the senses and analysed by the mind, is automatically construed as 'visualism' (Fabian 1983: 106–7). It is as though vision had been compelled to take on the mantle of a particular cognitive style, and all the virtues and vices that go with it. Naturally, critics of visualism have concentrated on the vices (Jenks 1995). David Levin, for example, insists that vision is 'the most reifying of all our perceptual modalities' (1988: 65),[27] whose hegemony in modern society can be linked to a will to power, technoscientific exploitation and political surveillance. And while he admits that vision might have its more open, caring or gentle side, this is to be found only on the margins, in the 'play of shadows and reflections' which reveal to us that 'we are, after all, phenomena of light' (pp. 429, 431).

However, to make the charge against vision stick, as Stephen Houlgate shows, one would have to show that seeing in *actual practice*, rather than as imagined by philosophers, harboured within itself a tendency towards reification (Houlgate 1993: 98–9). One would, in other words, have to breach those artificial barriers that separate life from discourse, allowing the realities of experience to intrude upon the hallowed turf of intellectual debate. Anthropologists do this all the time, indeed the creative tension between theoretical speculation and lived experience is the very driving force of anthropological inquiry. Historians of philosophy, on the other hand, are loath to mix the two, fearing that any move in that direction would threaten the integrity of their own, essentially literary project. That is why philosophical critics of visualism would never dream of asking the kind of question with which a hard-nosed psychologist like Gibson, for example, begins his study of visual perception: 'How do we see the environment around us?' (Gibson 1979: 1). For them, the answer is already presupposed: to see is to reduce the environment to objects that are to be grasped and appropriated as representations in the mind. The irony is that this

answer, which critics of visualism are inclined to take for granted, has its source in the very Cartesian epistemology that they seek to dethrone. What they offer, then, is not an account of visual practice, but a critique of modernity dressed up as a critique of the hegemony of vision.

From the arguments and evidence presented in this chapter I hope to have shown that the case against vision is comprehensively disproven. Indeed it should never have been brought in the first place. It is as unreasonable to blame vision for the ills of modernity as it is to blame the actor for crimes committed, on stage, by the character whose part he has the misfortune to be playing. With Houlgate (1993: 106, 111), I believe that the responsibility for reducing the world to a realm of manipulable objects lies not with the hegemony of vision but with a 'certain narrow conception of thought'. And it is this conception, too, that has led to the reduction of vision – that is, to its construal as a sensory modality specialised in the appropriation and manipulation of an objectified world. Through this reduction, as I have shown, vision came to be opposed to hearing. But there is nothing natural or pre-ordained about this opposition: as often as it is reasserted in academic books, it is belied by our own experience. It is my contention that by exploring the common ground between vision and hearing, rather than by abandoning the one for the other through a 'turn to listening' (Levin 1993: 3–4), we may be guided not only towards a better appreciation of the richness and depth of visual experience, but also towards a more generous, open-ended and participatory understanding of thought.

Part III

Skill

INTRODUCTION

In Western society we tend to think of art and technology as separate fields of endeavour, and the study of each has been built on different foundations. The chapters in this part suggest ways in which this separation might be overcome, by taking as a point of departure the skilled practices of socially situated agents. The first three chapters represent successive stages in my attempts to rethink the technical. It was in drafting the essay which now appears as Chapter Fifteen that it dawned on me that the opposition between intellectual design and mechanical execution, in terms of which discussions of human and animal toolmaking and tool-using have traditionally been couched, is in fact a phenomenon of Western modernity. Instead of assuming that technical operations are, by their very nature, mechanical, I argue in this chapter that the machine is an outcome of the historical development of the forces of production accompanying the growth of industrial capitalism. In this development the relations between workers, tools and raw material have been transformed, such as to replace subject-centred skills with objective principles of mechanical functioning. It is to these principles that the modern concept of technology refers. I show how the emergence of this concept was bound up with the rise of a mechanistic cosmology that separated design from construction, and reduced skilled making to 'merely technical' execution. Thus whereas in the artisan's handling of his tools, the movements of their working points are guided by his own perception, the motions of the machine, and any tools attached to it, are predetermined.

I conclude that the transition, in the history of human technicity, from the hand-tool to the machine, is not from the simple to the complex, but is rather tantamount to the withdrawal of the producer, in person, from the centre to the periphery of the productive process. It is a history, in other words, not of complexification but of externalisation. In Chapter Sixteen I consider how this conclusion might affect our understanding of the technical capabilities of hunters and gatherers. Classically portrayed as people with the simplest of technologies, it would be closer to the mark to say that hunter-gatherers have no technology at all. That is to say, their lives are not bound, as is so often suggested, to the operational requirements of a predetermined 'techno-environmental system'. Rather, the success of their way of life depends upon their possession of acutely sensitive skills of perception and action. Yet as properties of persons, developed in the contexts of their engagement with other persons or person-like agencies in the environment, technical skills are themselves constituted within the matrix of social relations. Hence, insofar as they involve the use of tools, these must be understood as links in chains of personal rather than mechanical causation, serving to draw components of the environment into the sphere

of social relations rather than to emancipate human society from the constraints of nature. Their purpose, in short, is not to control but to reveal.

Herein lay the second step in my rethinking of the technical. Having first recognised that hunting, for example, entails the practice of a skill rather than the operation of a technology, the stage was set for my realisation that technical relations, in pre-industrial societies, are embedded in social relations. It follows that the process of externalisation is also a process of disembedding of the technical from the social, ultimately giving rise to the modern, institutionalised separation of technology and society. Returning, however, to the context of modern industrial society, I began to think that this picture of a progressive evolution from skill to technology, in which the craftsman or artisan gradually gives way to the machine operative, is too simple. In Chapter Seventeen I present an alternative to this evolutionary model, while at the same time linking the discussion of tools and technicity to the issues of time and temporality adumbrated in Chapter Eleven. Following a classic article by historian E. P. Thompson, the transition from pre-industrial to industrial society has often been depicted as one in which a task-oriented time, grounded in the rhythms of social life, has been replaced by the mechanical regimen of the clock. Drawing on ethnographic studies of locomotive drivers I show, to the contrary, that task-orientation remains central to the experience of work in industrial society, even though the reality of that experience is systematically denied by the Western discourse of freedom and necessity. Indeed, clock time is as alien to people of industrial as it is to those of pre-industrial societies: the only difference is that the former have to deal with it. Likewise the machine operative of industrial society remains a skilled practitioner: his skill, however, lies in coping with machines rather than in their operation, and what it produces is not commodities for the owner of capital but his own personal and social identity.

In Chapter Eighteen I return to a theme already introduced in Chapter Five, concerning the difference between making things and growing things. There I was concerned to show what it means to say that the herdsman's animals, or the farmer's crops, are grown rather than made. I now take up the suggestion that artefacts, too, may be grown, and that in this sense they are not so very different from living organisms. To illustrate the argument I consider the weaving of a coiled basket. Conventionally, we regard weaving as a kind of making. Could we not, however, reverse the argument, and regard making as a kind of weaving? The effect of this reversal – which is precisely equivalent to our strategy, in Part II, of regarding building as a kind of dwelling – would be to place the emphasis on the skilled character of the form-generating process rather than upon the final form of the object produced. Evidently, a basket is not made through the forcible imposition upon material substance of some pre-existent design, included among the collective representations of a cultural tradition, as the standard notion of artefacts as items of 'material culture' would lead us to believe. For in weaving, a surface is built up rather than transformed, and the spiral form of the basket emerges through the rhythmic repetition of movement in the weaving process rather than originating in the maker's mind. Indeed, despite their different geometrical properties, there is a close parallel between the generation of spirals in artefacts (such as the basket) and in living organisms (such as in the shell of a gastropod). Just as the form of the organism is not prefigured genetically but arises through a process of growth within a morphogenetic field, so the form of the artefact is not prefigured culturally but arises through the unfolding of a field of forces that cuts across its developing interface with the environment.

Chapter Nineteen takes us back to the modern dichotomy between art and technology which, I argue, stands in the way of an appreciation of the true nature of technical skill.

To specify more precisely what I mean by skill, I highlight five critical dimensions of any kind of skilled practice. First, intentionality and functionality are immanent in the practice itself, rather than being prior properties, respectively, of an agent and an instrument. Secondly, skill is not an attribute of the individual body in isolation but of the whole system of relations constituted by the presence of the artisan in his or her environment. Thirdly, rather than representing the mere application of mechanical force, skill involves qualities of care, judgement and dexterity. Fourthly, it is not through the transmission of formulae that skills are passed from generation to generation, but through practical, 'hands-on' experience. Finally, skilled workmanship serves not to execute a pre-existing design, but actually to generate the forms of artefacts. Through a comparison of the looping skills involved in making string bags among Telefolmin people of Central New Guinea and the nest-building skills of the male weaverbird, I show that these dimensions of skill are equally evident in both cases. The conventional notion that the birds' activity is due to instinct whereas humans are guided by the dictates of culture is therefore inadequate. In both cases, the pattern of regular movement generates the form. And in both, the fluency and dexterity of this movement is a function of skills that are developmentally incorporated into the *modus operandi* of the body, through practice and experience in an environment. But this leaves us with a still unanswered question. How *do* the skills of human beings differ from those of non-human animals?

In a famous footnote to *Capital*, Karl Marx compared the history of human technology to the history of organic adaptation as described by Darwin in *The Origin of Species*. The comparison suggests three further questions. First, how – if at all – can we distinguish the evolution of technology from its history? Secondly, is there anything inherently progressive about technical change? And thirdly, are there grounds for supposing that such change is governed by a mechanism analogous to that of variation under natural selection? In Chapter Twenty I address each of these three questions in turn. The first takes us back to the problem of origins, already raised in Chapter Ten. Was there some take-off point in human evolution beyond which technology acquired a dynamic of its own, and could go on developing without any further change in human capacities? On the second question, I show that estimations of technological complexity are meaningless unless account is taken not just of material toolkits but also of the knowledge and skills required to operate them. Finally, while the analogies between technical change and organic evolution are suggestive, the way in which they are commonly drawn suggests that what changes is a *design* for the technical artefact, comparable to the organic genotype, rather than the form of the object itself. Our conclusion from Chapter Eighteen, however, is that the forms of artefacts, like those of organisms, arise through processes of growth within fields of relationships. To account for change in artefactual forms, therefore, we have to understand how these fields, and their generative potentials, are constituted and transformed over time.

Now if the same logic is to be applied to organisms, then we have to think about organic evolution in general, and human evolution in particular, in a completely new way. I attempt such a rethinking in Chapter Twenty-one. It is conventional, in palaeoanthropology, to distinguish between the process of evolution, leading from ancestral pongid and hominid forms to 'anatomically modern humans', and the process of history, leading from the Palaeolithic hunter-gatherer past to modern science and civilisation. I argue that this distinction is untenable. Comparing walking and cycling, as modes of locomotion, and speech and writing, as modes of communication, I show that these capacities cannot be opposed as, respectively, biologically innate and culturally acquired. They are, in every

case, embodied skills, incorporated into the human organism through a process of development. Thus the differences we call cultural are themselves biological. The reasons for the separation of biology and culture in orthodox theory lie in the identification of the former with a formal genetic 'endowment'. But form, I argue, is not received by the organism-to-be at the point of conception, but generated within the dynamic functioning of developmental systems. And through contributing to the environmental conditions of development for successor generations, organisms – including human beings – actively participate in their own evolution.

There can, then, be no specification of the essential form of humanity independent of the relational contexts in which human beings *become*. The notion of the 'anatomically modern human' is an analytic fiction, derived through the retrojection, onto the Palaeolithic past, of a concept of recent historical provenance in the West. I suggest an alternative approach to human evolution, starting from the inescapable condition of human beings' involvement in their diverse environments. This approach is taken one step further in Chapter Twenty-two, which focuses on the controversial issue of language origins. It has been customary, in discussions of this issue, to distinguish speech, as a universal human capacity, from the manifold languages of particular communities. It is supposed that the former is a product of evolution under natural selection, and is transmitted genetically, thereby establishing the cognitive foundations, in successive generations, for the acquisition of the latter through a parallel process of cultural transmission. But this distinction between genetic and cultural transmission, I maintain, is a consequence of the attempt to treat both speech in general, and languages in particular, as formal, rule-governed systems. This, in turn, betrays the scriptist bias of modern linguistic theory: the tendency to assimilate the spoken utterance, in its pure or ideal form, to the sentence of writing.

I propose a different view. Instead of regarding speech and language, respectively, as innate capacity and acquired competence, I maintain that speaking should be treated as a variety of skilled practice, with all the generic properties of skill outlined in Chapter Nineteen. Through a focus on skill as embodied knowledge we are able to dispense with the troublesome dichotomy between innate and acquired characters. But this also has the effect of dissolving the distinction between evolution and history, and with it, the point of origin constituted by their intersection. The notion of 'language origins' is thus shown to have itself originated within the current of modern thought, alongside the rationalisation of language associated with print literacy. However this same current has also yielded the three key terms – namely 'technology', 'language' and 'intelligence' – which generally frame contemporary accounts of the evolution of human cognition. Of course, in all societies people use tools and talk to one another, and these and other activities represent creative ways of coping in the world. But to say that everyday tool-using is a behavioural instantiation of technology, or that spoken dialogue is an instantiation of language, or even that creative activity is an instantiation of intelligence, is already to make certain rather problematic assumptions.

I conclude, in Chapter Twenty-three, by spelling out what these assumptions are and by suggesting how we might construct an alternative account that would dispense with them. This we could do by examining the relation, in human evolution, not between technology, language and intelligence, but between craftsmanship, song and imagination. I argue that song, far from being put together from separate linguistic and musical components, is rather a performative unity that is decomposed into these components through the imposition of a concept of language of modern origin. In just the same way, the modern concept of technology decomposes craftsmanship into the separate components

of rational-technical operations and expressive art. To focus on song and craftsmanship rather than language and technology is to foreground the poetic and performative aspects of speech and tool-use that have been marginalised by rationalism. Neither speech nor tool-use can be understood as the mechanical output of a mental constructional or problem-solving device, such as a technological or linguistic 'intelligence'. Both, however, involve imagination, understood as the activity of a being whose verbal creativity and puzzle-solving is carried on within the context of involvement in a real world of persons, objects and relations. I am, indeed, such a being, and one of the results of my activity is this book.

Chapter Fifteen

Tools, minds and machines

An excursion in the philosophy of technology

The technical and the mechanical

Do machines make history? In an article that takes this question as its title, Heilbroner (1967) identifies it as 'the problem of technological determinism'. That technology has to do with the construction and application of machinery may seem obvious to people in industrial societies. But what are we to make of history prior to the machine age? Were there machines about, shaping the course of history, in the days when virtually all tools were operated by hand, and when virtually all the power to operate them came from human muscles? What is the difference between tool use and machine performance, and how does it affect the involvement of the human subject in the act of making? Reflecting on these questions, one is bound to inquire into the nature of the machine, and into the broader applicability of the relatively modern concept of technology, particularly in analyses of pre-industrial or non-Western societies. Such an inquiry touches on important issues in the philosophy of technology, and has considerable historical and anthropological implications. In our own age the concept of technology has become such an established part of thinking on humanity and the 'human condition' that we are inclined to use it as a window through which to view tool-assisted practices of all kinds, past and present, Western and non-Western, human and animal. Thus we imagine that where tools are being used *there must exist a technology*. But what, exactly, is entailed in this assumption? How does it affect our understanding of what it means to make things? And how might this understanding be changed if we were to regard the use of tools not as the operation of a technology but as an instance of skilled practice?

Let me begin with a brief etymological prelude. The word 'technology' is a compound formed from two words of classical Greek provenance, namely *tekhnē*, which meant the kind of art or skill that we associate with craftsmanship; and *logos*, which meant roughly a framework of principles derived from the application of reason. Just occasionally, *tekhnē* and *logos* were combined in classical literature to denote the art of reason, or the skill involved in rhetorical debate. But in contemporary usage the meaning of technology is just the reverse: namely, the rational principles that govern the construction of artefacts – or more simply, the reason of art rather than the art of reason. In this sense, the term did not come into regular use until well into the seventeenth century (Mitcham 1979). And it is no accident that its coinage coincided with the radical transformation in Western cosmology ushered in by such figures as Galileo, Newton and Descartes. For the specific achievement of these pioneers of modern natural science was to establish the idea that the universe itself is a vast machine, and that through a rational scientific understanding of its principles of functioning, this machine could be harnessed to serve human interest and

purposes. Thus technology came to be seen as the application of the mechanics of nature, derived through scientific inquiry, to the ends of art.

The shift from the classical concept of *tekhnē* to the modern concept of technology has brought about a profound change in the way we think about the relation between human beings and their activity. In its original, Aristotelian conception, *tekhnē* meant 'a general ability to make things intelligently' (Bruzina 1982: 167), an ability that depends upon the craftsman's or artisan's capacity to envision particular forms, and to bring his manual skills and perceptual acuity into the service of their implementation. But with the adoption of a mechanistic view of nature, the activity of making began to take on a quite different aspect. The image of the artisan, immersed with the whole of his being in a sensuous engagement with the material, was gradually supplanted by that of the operative whose job it is to set in motion an exterior system of productive forces, according to principles of mechanical functioning that are entirely indifferent to particular human aptitudes and sensibilities.

The artisan, of course, knows what he is making, and works to clear standards of perfection. He may be less than clear, however, about the methods by which his results are achieved, and is often quite unable to specify these methods with any precision. The operative, on the other hand, is guided in his activity by formal and explicit rules of procedure whose validity is independent of the specific ends to which they are applied. These rules, grounded in the general principles of mechanics, furnish the *logos* of *tekhnē*, the rationalisation of the process of production that was lacking from the craftsman's art (Mitcham 1979: 182). The effect of this rationalisation, however, is to remove the creative part of making from the context of physical engagement between workman and material, and to place it antecedent to this engagement in the form of an intellectual process of design. A thoroughgoing distinction is thus introduced between the design of things and their construction. The thing, we say, is virtually 'conceived' in advance of its realisation in practice. According to one view, these phases of design and construction correspond to the separate provinces of engineering and technology respectively (Mitcham 1978: 230). The engineer, in Mitcham's words, 'is not so much one who actually makes or constructs an artifact, as one who directs, plans or designs', whereas the technician or technologist has the knowledge and proficiency to execute designs rather than to conceive them.

This dichotomy between conception and execution is institutionalised, however, in many other domains of modern society. It is apparent, for example, in the opposition between architecture and the building industry: the architect, classically a 'master-builder', is now a creator of structures that are left to the industry to put up. The architect designs the house, the builder implements the architect's design. One creates but does not implement; the other implements but does not create (Coleman 1988: 15–16). An identical logic, incidentally, underwrites the distinction in natural science between theoretical conjecture and experimental observation. And significantly, the process by which the architect or theoretical scientist arrives at novel ideas, as distinct from their subsequent implementation or testing, is often described as more akin to art – a term once synonymous with practical skill but now opposed to technology as the spontaneous work of the human imagination to the mechanical execution of predetermined operational sequences. Where excellence in the one field is attributed to genius, in the other it is attributed to expertise. Thus, constituted by its opposition to design, technique is reduced to the 'merely technical', and ultimately to the mechanical.

Now in the classical conception, *tekhnē* and *mēkhanē* were opposed as skills to the various mechanical devices which assist their application. In the modern view, by contrast,
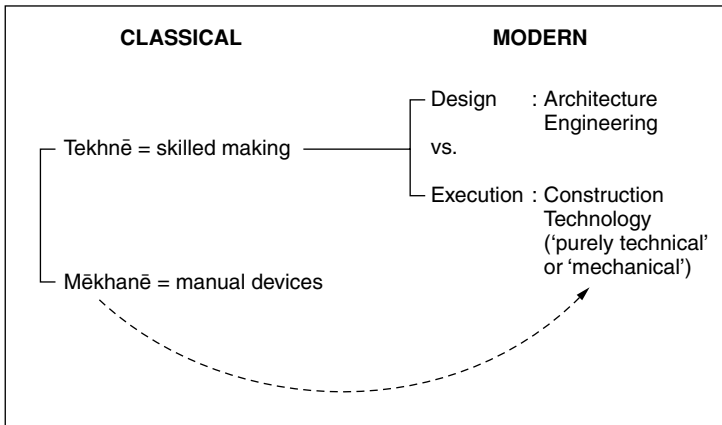
Figure 15.1 A comparison of classical and modern conceptions of the technical.

the technical has joined the mechanical, meaning 'an instrumentality of a particular sort, namely, that which can be separated from the specific context of human experience and sensibility as operative in making' (Bruzina 1982: 167). To borrow, with some modification, a diagram from Bruzina, classical and modern understandings of the technical may be compared as shown in Figure 15.1. With this reduction of skilled making, *tekhnē*, to 'purely technical' execution, the performance is no longer seen to issue from the hand and eye of the concrete, experiencing human subject, and acquires a kind of objectivity and independence from human agency. For whereas the work of making originates with the craftsman or artisan, the operative is merely accessory to processes whose specification has been laid down in advance. It is this *separability* of constructive work from the context of sensory experience that gives it the quality of being mechanical. With the machine, as Bruzina puts it, 'the entire work-action becomes something that can be dealt with independently of human being in its properties and principles of function' (1982: 170). Whether or not the work is actually powered by human muscles is beside the point. Whatever the motive force, where the movements of an instrumental apparatus in the execution of a given design are independently prescribed in its initial conditions, and follow a set course, we are dealing with a machine performance. And the prescriptions embodied in the machine, derived through the application of scientific law, are of course technological.

THE DEFINITION OF TECHNOLOGY

A cursory review of the literature in the history and philosophy of technology reveals a plethora of approaches to the definition of its subject matter, not unlike that in anthropology surrounding the definition of culture. Both disciplines have faced an uphill task in their search for a concept, whether of technology or culture, whose meaning transcends the very historical and ethnological variation they aim to document, and of which their own inquiries are a part. Thus definitions of technology differ widely, depending on whether the intent is to embrace the totality of human works, in all societies and during all epochs, or to mark the specific historical transformations that gave rise to the concept in the first place. Bruzina exemplifies the latter approach, in advancing his thesis that 'only

when making by way of the instrumental device becomes principally a machine perform-ance, and the minding of it principally science, does *tekhnē/ars* become *technology* in the proper sense of the word' (1982: 171). He is subsequently still more explicit about the term's historical specificity: 'technology is the action of making when the knowledge that guides it is explicit science as that has developed since the time of Galileo' (1982: 178). Cardwell is likewise careful to distinguish 'technology', as a neologism of the seven-teenth century, from the previous, and more elementary 'technics'. He associates the emergence of technology with a mechanistic ontology that led to the practice of technics 'becoming self-conscious and at the same time increasingly science-based' (Cardwell 1973: 360).

This approach to the definition of technology leads inevitably to the problem of its relation with science. I do not intend to dwell at any length on this controversial issue. It suffices to draw a broad distinction between those who would not credit technology with any autonomous knowledge base of its own but rather regard it as the practical appli-cation of knowledge that belongs essentially to science, and those for whom technology exists as a knowledge system in its own right, alongside science but no more dependent on it than is science on technology. An instance of the former position is the definition with which Singer, Hall and Holmyard preface their massive *History of Technology*. It is a history, they claim, of 'how things are commonly done or made' and 'what things are done or made' (1954–8, I: vii). The knowledge that underlies both the 'how' and the 'what' is conspicuously absent from their definition. It is assumed that such knowledge pertains to science, not to technology. And yet the definition is intended to be applicable to the entire sweep of human history, beginning with the origins of language and the first man-made tools. If technology is all toolmaking and tool-using, guided only during the modern era by scientific knowledge, we are left wondering – with Layton (1974) – what kind of knowledge could have informed the making activities of pre-modern societies. Layton's own position accords with the second of the two approaches outlined above: he defines technology as 'systematic knowledge of the industrial arts' (1974: 3), both distinct from and complementary to science. More recently, Adams (1996) has taken a similar view, arguing that at no point in its history has technology ever been the mere imple-mentation of scientific knowledge. Rather, Adams claims, scientists and technologists have distinctive ways of knowing and thinking, and have coexisted in a relationship that, though tense and awkward, has always been two-way.

For other writers, technology is effectively equivalent to the field of operation of human labour, together with the products to which it gives rise. Drucker, for example, defines technology 'as human action on physical objects or as a set of physical objects charac-terised by serving human purposes. Either way the realm and subject matter of the study of technology would be human work' (1970: 39). But to equate technology with work is to render it redundant as a conceptual category. It might make more sense to say that human work is the *context* for the study of technology. Mitcham's suggestion that 'the term [technology] be stipulated to refer to the human making and using of material artefacts in all forms and aspects' (1978: 232) suffers from the same problem of over-generality, and the same unnecessary conflation of technology with the labour-process. There seems to be no way to prevent the concept of technology from spilling over from a narrow focus on tools and techniques to embrace the entire field of human endeavour. Is there anything, the sceptic might ask, about human life and activity that is not tech-nological? If not, what need have we for the concept of technology at all? Beyond stating the obvious, how does it help us to know that *everything* is technological?

Another family of definitions focus explicitly on the idea of technology as a corpus of knowledge, as distinct both from the productive activities in which it is put to use, and from the artificial products of such activity. Burns recognises that there is a major discrepancy between historical and sociological usages that link technology to the rise of science and mechanised industry in the modern Western world, and the much broader usage of anthropologists and archaeologists who would apply the concept to peoples of all times and places. In the former usage, technology is 'the body of knowledge about (a) scientific principles and discoveries and (b) existing and previous industrial processes'; in the latter it is 'the body of knowledge available for the fashioning of implements of all kinds, for the practice of crafts and manual skills . . ., and for the extraction and collection of materials of all kinds' (Burns 1964: 716). In a classic anthropological statement, Firth defines the technological system as the 'material equipment, and body of knowledge at command of the participants in the economy' (1939: 78). And according to Merrill, technologies are 'bodies of skills, knowledge, and procedures for making, using and doing useful things', or more broadly, 'technology . . . connotes the practical arts' (1968: 576).

Now skills, knowledge and procedures could all be regarded as parts of human culture, leading Margolis to observe that 'culture is both the context of technology and the genus of which the technological cannot be more than a determinate species' (1978: 27). Non-human animals, of course, may be credited with both perceptual knowledge and practical intelligence; however it is widely believed that they lack the symbolic intelligence which is a prerequisite for the intentional design of novel forms (invention) and for their transmission by teaching rather than imitative learning. At the root of this capacity for symbolically mediated thought and instruction, according to Margolis, is language: thus for him, technology is 'the practical capacity of a creature that has mastered language and that can consider alternative ways of acting and making' (1978: 28). In this sense, far from being limited to certain societies and periods, technology might be considered a human universal, 'roughly characterized as the intersection of practical knowledge and ideology' (Margolis 1978: 34). I have myself argued, along rather similar lines, that while technology consists of knowledge encoded in symbols, it is knowledge only in a certain aspect, as models *for* rather than *of* (Geertz 1973: 93–4), and that knowledge becomes technology by virtue of a 'practical orientation to the material world' that simultaneously converts neutral objects into useful equipment (Ingold 1986a: 43).

Perhaps the most comprehensive characterisation of technology in recent literature comes from McGinn: 'it is', he writes, 'a form of activity that is fabricative, material product-
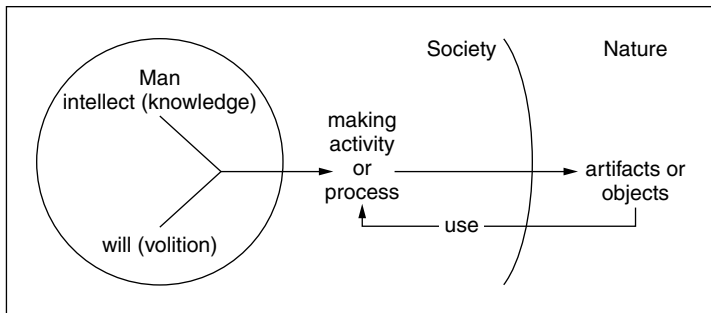
Figure 15.2 Modes of technology

After C. Mitcham, Types of technology, *Research in Philosophy and Technology* 1, 1978, p. 234.

making or object-transforming, purposive (with the general purpose of expanding the realm of the humanly possible), knowledge-based, resource-employing, methodical, embedded in a sociocultural-environmental influence field, and informed by its practitioners' mental sets' (1978: 190). As a definition this is hopelessly cumbersome; it does however have the advantage of providing a convenient checklist of factors that need to be considered in any complete account of the human labour-process as it is involved in the production of things. In order to resolve the definitional turmoil revealed in the foregoing discussion, a necessary first-step is surely to separate out the components of purpose, knowledge, activity and artefacts that are implicated in productive work. Mitcham distinguishes between technology-as-objects, technology-as-process, technology-as-knowledge and technology-as-volition, linking them together in the form of a diagram reproduced here as Figure 15.2 (Mitcham 1978: 233–4). I find this a helpful place from which to start.

OBJECT, PROCESS, KNOWLEDGE AND VOLITION

'Technology-as-objects' encompasses the entire range of fabricated items intended for some use or other, including – in Mumford's classification (1946: 11) – tools, utensils, utilities, apparatus and machines. Mumford brings all of these under his notion of 'technics', a term which we could well retain to denote the area of overlap between *instruments* and *artefacts*. An instrument, or 'tool' in the broadest possible sense, is any object that can be turned to account by an animal (not necessarily human) in the realisation of its project (Ingold 1986a: 47). Many instruments, even human ones, are in no sense constructed for a purpose: I have one such beside me as I write, a stone recovered from a pebble beach which I use as a paperweight. The stone is a tool but not a technic. Likewise the earth is not a technic, even though Marx referred to it (not without a hint of absurdity) as 'the most general instrument of labour . . . since it provides the worker with a platform for all his operations' (1930: 173). On the other hand there are artefacts which, though fabricated in accordance with an already existing design, are not designed to be used in any further project of fabrication. A piece of sculpture is an artefact, so is a cake, but neither of them is a technic.

The second mode of technology in Mitcham's scheme, 'technology-as-process', includes most importantly the activities we commonly denote as making and using. Of course in making one thing we commonly use another, though the reverse does not hold (Mitcham 1978: 253, Ingold 1986a: 58). The key element here is that of skill, defined by Feibleman as 'proficiency in the use of artefacts' (1966: 318). It is this element that makes tailoring and weaving, to use Marx's example, 'qualitatively different productive activities', although both involve the expenditure of physical and mental effort, and 'in this sense are both of them human labour' (Marx 1930: 13). Note however that skilled activity does not necessarily result in the production of objects, nor need it involve their manipulation: the violinist performs on her instrument, but the dancer performs with her own body. Clearly, therefore, technique must be conceptually disengaged from technics. But we face a more difficult problem when we come to the distinction – if one can be made – between skill and intelligence, or between technique and technology in the third of Mitcham's modes, as knowledge.

One possible formulation of this distinction is suggested by David Pye (1964: 55). He regards skill simply as a 'particular application of dexterity', in contrast to what he calls 'know-how', which refers to the capacity of the craftsman to envision forms in advance of their implementation. I have suggested elsewhere that the priority of know-how over

skill could mark a critical threshold in the evolution of human constructive abilities, making possible the design of new forms and thus greatly speeding up the tempo of cultural change (Ingold 1986a: 31). Edwin Layton makes a rather similar distinction between skill and knowledge, while insisting that you cannot have one without the other: 'Technique means detailed procedures and skill and their application. But complex procedures can only come into being through knowledge. Skill is the "ability to use one's knowledge effectively". A common synonym for technology is "know-how". But how can there be "know-how" without knowledge?' (1974: 33–4). Layton identifies the 'central purpose of technology' as design, 'an adaptation of means to some preconceived end'. Originating as a conception in the designer's mind, it is converted by degrees into detailed blueprints, which in turn are translated into tools and artefacts. Technology, Layton suggests, may be viewed as the entire spectrum from ideas, through blueprints and techniques, to things (1974: 37–8).

The fourth of Mitcham's 'modes of technology', as volition, is the least developed and most problematic. It expresses the crucial fact that human labour is, by and large, *purposive* activity (Marx 1930: 170). Yet as we shall see, the will that instigates production is not necessarily the will of the producer. The craftsman of capitalist manufacture certainly knows what he is making, and handles his tools accordingly. In that sense he is personally involved in his work in a way that the machine operative is not (Feibleman 1966: 321). But that capacity to envision and implement, depending as it does on acquired skills of perception and action, is not his to command, for along with his bodily energy it forms part of the labour power contracted to the employer. Thus the alienation of labour power under capitalist relations of production did not, at least prior to the introduction of industrial machinofacture, entail any split between the capacities of mind and body. Rather, the line of division lies between the capacities of the whole person, inseparably mind and body, and the agency that puts these capacities to work. In short, to say that a man works from his own *knowledge* is not the same as saying that he works of his own *volition*. This is a point to which I shall return, in the context of a comparison between the 'subjective' labour organisation of manufacture and the 'objective' organisation of machinofacture. But first we have to look more closely at the distinction between machines and ordinary tools.

ON THE DIFFERENCES BETWEEN MACHINES AND TOOLS

To define the machine is no simple matter, since the term has undergone important changes in its meaning from antiquity to the present day. Originally connoting an 'instrument for lifting heavy weights', using the principles of wheel and axle, lever and inclined plane, but empowered by the human body through the hand, in its modern sense the machine is often distinguished from the tool on the grounds that it draws on a source of power outside the body, and is not manually operated (Mitcham 1978: 235–6, 271–2 fn. 16). Thus the notion of the tool has come to be reserved for that aspect of a device that is activated by human agency, whereas 'machine', in Mitcham's words, commonly 'denotes an instrument in its human independence, or at least that aspect of the device which is not dependent on man' (1978: 236). This view is not far removed from Mumford's earlier contention that 'the essential distinction between a machine and a tool lies in the degree of independence in the operation from the skill and motive power of the operator: the tool lends itself to manipulation, the machine to automatic action' (Mumford 1946: 10).

Taking the 'degree of independence' as a variable, we could envisage a continuum whose poles are on the one hand the human body, performing operations unassisted by any extra-somatic aids whatever, and on the other hand the automaton, in which not only the motive power but also the operational constraints are packaged within the same artificial system. Just such a continuum was envisaged by André Leroi-Gourhan in his monumental work on *Gesture and Speech*. He divided the continuum into five stages, arranged in an evolutionary sequence, beginning with that of manipulative action, in which the practitioner works with bare hands. This is followed by the hand's exerting a direct motor function, by moving the tool in its grasp. In the third stage the hand exercises an indirect motor function, by applying force to a device, such as a spring, crank, lever or pulley cable, that in turn moves the tool. In the fourth the hand works to harness the energy of a non-human power source, which in turn directly or indirectly moves the tool, as with animal traction, water-driven mills, and so on. Finally, in fully automatic action, there is nothing for the hand to do but to set off a programmed process by pushing a button or throwing a switch (Leroi-Gourhan 1993: 242–9). The whole process may be seen as a gradual displacement of technical operations from the human organism onto the artificial machine, a displacement that Leroi-Gourhan calls 'exteriorisation'. For Leroi-Gourhan, however, the exteriorisation of technical operations did not fundamentally alter their nature. In the routine manipulation of hand tools, he believed, the body functions to all intents and purposes like a machine; or to put it the other way around, the workings of the machine effectively mimic those of the living body, of which it is but an 'improved artificial copy' (1993: 269).

Writing a century before Leroi-Gourhan, Karl Marx had also embarked upon a comparison between the human handling of tools and machine performance. But he had come to precisely the opposite conclusion. Crucial to handling, in Marx's terms, is that the worker does not just apply motor force but actually guides the movement of the tool, watching as he works, and making continual adjustments in response both to environmental perturbations and to his perceptual monitoring of the developing form. In the machine, by contrast, responsibility for the movements of the tool – or what has now become the device's 'working point' – is transferred from dextrous hands to a mechanism that is indifferent to its surroundings and answerable only to instructions that have been fed into it in advance. Once the guidance of the working point is relinquished to the machine, Marx argued, it is more or less incidental whether the motive power comes from human muscles, from non-human animals such as horses (whose substitution for humans in this capacity gave rise to the notion of 'horse-power'), or from wind, water, steam, electricity or whatever (Marx 1930: 396–7). Thus a machine may still be hand-operated, but when the hand delivers only muscle-power and not skilled constraint – that is, when the technically effective gesture ceases to be coupled to immediate sensory perception – the tool or working point is no longer 'handled' in Marx's sense. The essential distinction, as he put it, lies 'between a man as a simple motor force and as a worker who actually handles tools' (1930: 395).

Bearing this distinction in mind, we may observe that the transition from hand tool to automatic machine can take two alternative courses, as shown schematically in Figure 15.3. The diagram is constructed from three binary oppositions, between (1) human (–) and non-human (+) power; (2) skilled (–) and mechanical (+) constraint; and (3) somatic (–) and extra-somatic (+) working points. With the hand tool (a), the working point is a detached instrument, but the hand that holds it not only delivers a bodily power but also guides the motion of the tool. With the automaton (d), these human functions have
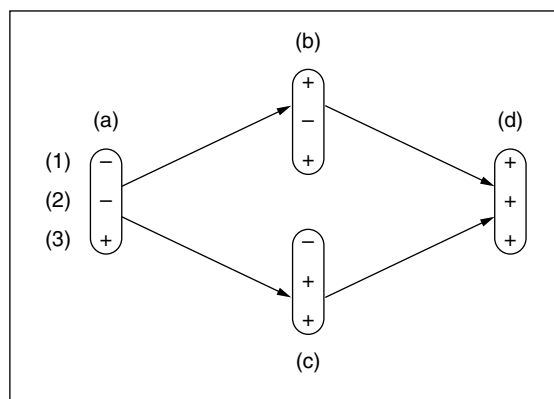
Figure 15.3 Routes of transition from hand tool to automaton.

been entirely supplanted by the apparatus. Of the two intermediate cases, (b) and (c), the first comprises what are often called 'machine tools', which, though driven from an external power-source, still call for skilled manipulation by an operator. An example is the power-drill. But in the second case, of 'man-powered machines', the opposite situation obtains, for the constraint is mechanical, while human beings merely supply the motive power, for example by working a treadle, turning a crank, or operating a pump-handle. The line of distinction between manpower and skilled constraint thus places (c) on the side of the machine, but leaves (b) on the side of the tool.

There are, it is true, certain devices that appear at first glance to resist classification in these terms. Consider for example the pedal-powered potter's wheel. Not only does the potter provide the motive force, but he also shapes the pot using his fingers, unaided by any other instruments whatever. The wheel is surely a detached device, yet the power, the skill and the working point are all supplied by the human operator. The paradox presented by this instance is resolved by recognising that in operating his wheel, the potter is really working two systems simultaneously. One, driven by the body via the feet, generates the rotary motion of the pot, and requires no skill (barring perhaps a speed control). The other is a skilled system comprised by the intimate co-ordination of manual, visual and tactile functions. Technically, therefore, the wheel is a machine, operated in conjunction with a somatic tool, the hand. The situation with regard to the woodworker's lathe is similar, except that since wood is not pliable as is clay, the hand operates through the medium of a chiseling tool. It is important to recognise such compound systems for what they are, since even the total automation of one component need not in any way reduce the element of human 'handling' of the other component. This is a point to which I shall return.

MOTORS, TRANSMITTERS AND WORKING PARTS

A complete machine, according to Marx, 'consists of three essentially distinct parts, the motor machine, the transmitting mechanism, and the mechanical tool or working machine' (1930: 393). This was no new idea: when Marx was writing it was already part of the orthodoxy of French mechanical instruction, supported by the authority of the geometer-engineer, Jean-Victor Poncelet (1788–1867). 'The science of machines', as Poncelet had written, 'consists of the science of tools, the science of motors, and the science of communicators or modifiers of movement' (Poncelet 1844, III 11, my translation). Besides noting the interchangeability of manpower and machine-power, Marx devoted some attention to the functional equivalence of manually-operated and machine-operated tools or working parts. The spindles of the spinning machine, the knives of the chopping machine and the saws of the sawing machine are all immediately recognisable as the counterparts of tools once manipulated by hand, albeit much modified to fit in with the requirements of the apparatus. But emancipated from the bodily restrictions of manual operation, such tools

could increase in number or scale by several orders of magnitude. The spinner can operate only one wheel at a time, whereas the spinning jenny has up to eighteen spindles going simultaneously; the steam-hammer has a head just like the hammer of the blacksmith, but as Marx observed, 'such a heavy one that Thor himself could not wield it' (Marx 1930: 408). Nevertheless, despite their gargantuan proportions, mechanised tools carry out 'the same operations which the manual worker of former days carried out with tools of a like kind' (1930: 394).

Thus with regard to both motive power and working parts, the difference between tools and machines is one of degree rather than kind. For Marx the essential, qualitative difference, as we have seen, lies in the substitution of a mechanically determining system for a skilled system of constraint (on this distinction, see Pye 1964: 53–4). Curiously, however, the latter criterion does not enter into Marx's initial specification of the components of the complete machine, whereas the 'transmitting mechanism', which does appear as the third term of his specification – alongside motive power and working parts – receives no further mention at all. This mechanism, corresponding to the 'communicators' and 'modifiers' of Poncelet, consists of pulleys, cog-wheels, belts, gears, etc., all of which impart motion to the tool. In the case of manually operated tools, the transmission function is of course performed by the links and joints of the human skeleton. Empowered by the muscles, its characteristic movements are of a reciprocating, back-and-forth nature, and these are transmitted directly – via the handle of the tool – to its working point. But machines, unlike tools, 'typically achieve their effect by means of rotary rather than reciprocating motions' (Mitcham 1978: 239, cf. Mumford 1946: 80). Now rotary movement does not come naturally to the body: it is acquired only with difficulty and is always discontinuous. As Lynn White observed: 'continuous rotary motion is typical of inorganic matter, whereas reciprocating motion is the sole form of movement found in living things' (1962: 115). Hence a necessary step in the transition from hand tools to man-powered machines – from (a) to (c) in Figure 15.3 – was the incorporation of an artificial mechanism that would convert reciprocating to rotary motion. Such a mechanism is the crank, and its discovery represents one of the most important moments in the early development of machinery (White 1962: 103–17).

Is there, then, any connection between the substitution – by means of a transmitting mechanism – of rotary for reciprocating motion, and the substitution of mechanical determination for skilled constraint? Or to put the question another way: can a tool or working point be handled if its motion is fundamentally distinct from the motion of the hand as an empowering agency (Bruzina 1982: 170)? The potter, working with bare hands, can feel the clay as he shapes it, but this is no less true of the woodcarver who – though he perforce must use a tool such as a knife or chisel – feels the wood through its contact with the tool more than he does the tool through its contact with the hand. It is not difficult, moreover, to think of examples where the technically effective gesture remains closely coupled to sensory perception, even though the application of force is indirect. The sailor, hauling a rope through a pulley block, still feels the wind in the sails. But the hurdy-gurdy player differs from the violinist in that, whereas the latter feels the resistance offered to the bow by the vibrating string (rather than that offered to his hand by the chock of the bow), the former feels only the resistance of the handle of the wooden wheel that, as it is turned, rubs against the strings and causes them to vibrate.

It is perhaps no accident, then, that most examples of devices in which a man acts, in Marx's words, only as 'a simple motor force', work by rotary motion. It would seem that, in operating a crank, the intimate link between hand and tool – by virtue of which the

latter is experienced by the operator as an extension of the former – is severed. More generally, the conversion of reciprocating to rotary motion through a transmitting mechanism decouples action from perception, divorcing technically effective operations from their context in the immediate sensory experience of practitioners. It is no longer possible, as the exercise of skilled constraint requires, to feel or to respond to the work of the tool upon the material. Indeed the device may be operated just as well, if not better, by foot as by hand, as in the the case of the aforementioned potter's wheel. For while it lacks the dominant hand's dexterity, the foot is probably a more efficient deliverer of sustained muscle-power.

That the transition from hand-tools to man-powered machines generally involved a conversion of reciprocating to rotary motion is also indicated by the modifications entailed in their working parts. For example, oars give way to rotating paddles, the straight saw becomes circular, and the rectangular surface of the whetstone gives way to the cylindrical surface of the grinding stone. Where, on the other hand, mechanisation involves the substitution of machine power for manpower, as in the development of so-called machine tools, the mechanism of transmission often has quite the opposite function: not of converting the reciprocating movement of the body into the rotary movement of the working part, but of converting the rotary movement of the mechanical motor into a reciprocating movement that *imitates* the original movement of the body in its operation of a working part which remains unchanged in form (if not in scale). One example is the mechanised pile-driver; another is the electric toothbrush.

THE COMPLETE MACHINE

Up to now we have kept within Poncelet's conception, endorsed by Marx, of the complete machine as a combination of motor, transmitter and working parts or tools. Though at first glance this makes a good deal of sense, it will not withstand closer scrutiny, as was shown by Reuleaux in his classic work of 1876, *The Kinematics of Machinery*. Considering first the nature of the tool, Reuleaux observes that there is a large class of machines from which the tool is completely absent, namely those used for altering the positions of things, or 'place-changing machines'. An example is the crane. It might be supposed that the rope is the transmitter and the hook the tool. But we could, if need be, reject the hook and lift a load by tying a loop in the rope. Do we say, then, that the loop has become the tool? What if the load is discarded and we wish to wind up the empty rope? The tool has apparently disappeared, while what we had thought to be the transmitter of motion (the rope) has now become the object moved. Yet the crane functions entirely as before. If the functioning of the machine is indifferent to the presence or absence of the tool, the latter cannot be essential to its completeness.

Those machines that are equipped with tools, Reuleaux argued, have as their common object the alteration in form of some material: they are 'form-changing machines'. Looking more closely at the relation, in such machines, between the tool and the object worked upon (the work-piece), Reuleaux comes to a rather remarkable conclusion: that the work-piece is in fact an integral part of the machine, regarded as a 'closed kinematic chain'. The interface between tool and work-piece is just one of any number of points through which the chain continues without interruption. Indeed it is not always possible to draw the line at all between work-piece, tool and transmitter. In a spinning machine, for example, the thread is not only what is worked upon but also a transmitter of force, while every fibre of the thread acts as a tool for twisting each and every other. This same observation

resolves the paradox of the crane, where the rope may be regarded interchangeably as a transmitter, a lifting device and an object lifted. In all these capacities both the rope and anything that may be attached to it are simply parts of the whole machine.

If the machine 'ends' in the work-piece rather than the tool, it likewise begins with the 'prime-mover' rather than with the receptor of that motion. The prime-mover, or driver, could be a machine such as a steam-engine, or a living agent (human or animal). Reuleaux's discussion of the mechanical employment of human muscle-power is especially revealing. Reproduced in Figure 15.4 is his diagram of a man operating a treadle grindstone. It shows that in operation, 'the body of the worker becomes kinematically chained with the machine' (1876: 500) – in other words the worker is as much a part of the machine as is the work-piece. Now if we disregard what the man is doing with his hands and arms, and the object he holds, the stone itself could be treated as the work-piece, and the whole machine as a place-changer designed to secure the rotation of the stone. From the diagram it can be seen that the machine operates through the kinematic conjunction of two lever cranks. One crank is formed by the links a, b and c, secured at points 1 and 4 by the fixed frame d. The other crank, which drives the first, is formed by the links a′, b′ and c′, secured at points 1′ and 4 by the fixed frame d′. There is no difference, in principle, between the artifical coupler b and the shinbone b′, nor between the frame d, built into the structure of the device, and the frame d′, formed through the posture of the man. As this example demonstrates, the machine is not external to the worker, 'receiving' from him its motive force, for in reality 'the worker makes a portion of his own body into a mechanism, which he brings into combination, that is chains kinematically, with the mechanism to be driven' (1876: 501).

The definition of the machine that Reuleaux proposes (having discussed a whole catalogue of contemporary alternatives, see his footnote 7, pp. 587–90) runs as follows: 'A machine is a combination of resistant bodies so arranged that by their means the mechanical forces of nature can be compelled to do work accompanied by certain determinate motions' (1876: 35, 503). Mumford's criticism (1946: 9) that this definition 'leaves out the large class of machines operated by manpower' is quite unfounded, since as we have seen, Reuleaux devotes some attention to the consideration of such machines, concluding that – insofar as the body delivers a purely physical effort – it is a 'force of nature' like any other, that can be harnessed to drive a kinematic chain. 'So far . . . as machines driven by muscular power are themselves closed kinematic chains, they may be
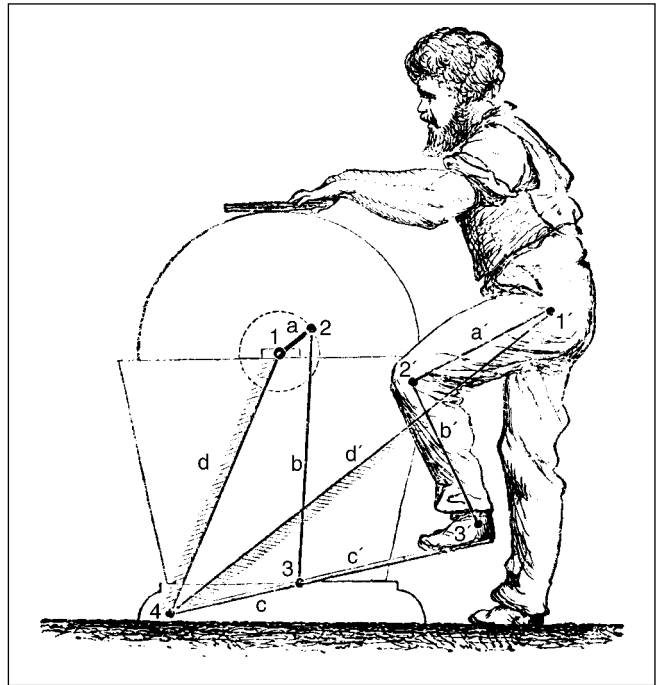
Figure 15.4 Man working a treadle grindstone

From F. Reuleaux, *The kinematics of machinery*, published by Macmillan, 1876, p. 501.
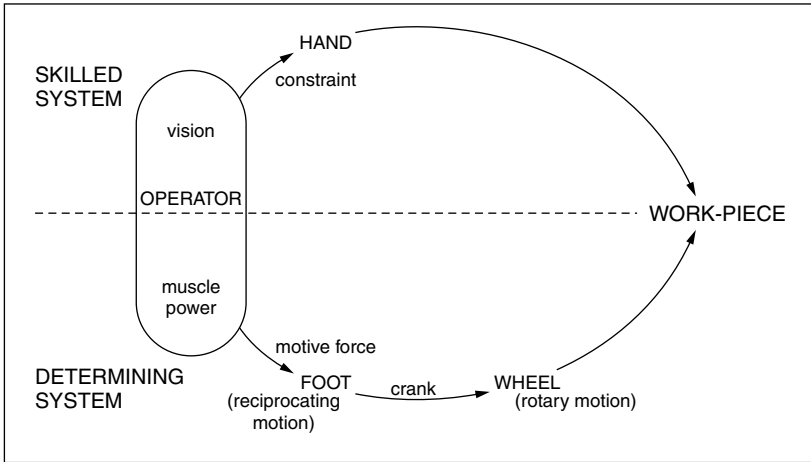
Figure 15.5 Skilled and determining systems.

regarded as complete machines, and do not themselves differ from machines driven by any other than muscular force' (Reuleaux 1876: 508). However, Reuleaux does recognise that the employment of humans and animals to drive machinery introduces a 'special compli-cation' in that the movements of links in the organic part of the kinematic chain are nec-essarily constrained 'by the action of forces commanded by the will' (1876: 508). Returning to the man in the diagram (Figure 15.4), to the extent that the work performed by the lower part of his body is 'purely physical . . . and not intellectual', this complication may be safely ignored. But if we consider the upper part of the body, then it is apparent that he is linked into the machine in a quite different way: holding the work-piece in skilled hands, he is constantly adjusting its position and pressure against the stone, under a close and watchful gaze.

Like the potter in our earlier example, we may say of the grinder – with Reuleaux – that he 'is doubly connected to the machine at which he works', or that 'human agency has a twofold action in it' (1876: 509). In both machines, potter's wheel and grindstone, the work-piece stands at the point of intersection between the two systems: the one imparting 'determinate motions', the other skilled constraint. The fact that in the one case the work-piece is affixed to the rotating wheel while worked upon by the hand, whereas in the other it is held in the hand while worked upon by the rotating stone, is immaterial. The important point is that by the twofold action of the human operator, skill has been dissociated from motive force, even though both are delivered by the same agent. In Figure 15.5 this point is illustrated diagrammatically. In the determining system, operated through the foot, all possible motions are fixed in advance by the structure of the machine; in the skilled system, operating through the hand, motions may be varied at will, and the intended result is achieved through a continuous process of modification and adjustment, requiring constant visual attention (cf. Pye 1964: 54).

Machines and animals

Before pursuing further the implications of this distinction between skilled and deter-mining systems, I should like to make a brief detour to consider the human employment

of domestic animals. I have noted in passing that human muscle power may be replaced by the power not only of inanimate machines, but also of non-human animals. How, then, does the use of domestic animals differ from the use of tools and machinery? And to what extent can the relation between the animal and its human master (or mistress) be compared to man's mastery over the machine?

Marx, at one point, is quite prepared to treat domestic animals as 'instruments of labour', taking their place alongside the established repertoire of simple hand tools: 'From the dawn of human history, man, in addition to making use of elaborated stones, pieces of wood, bones and shells, turned to account the services of domesticated animals as instruments of labour – these beasts, tamed, modified, bred by human labour, being among the chief of the primitive instruments of labour' (1930: 171–2). But to regard the animal as a mere tool is to deny its capacity for autonomous movement (Reed 1988a); tools cannot 'act back' or literally *interact* with their users, they only conduct the users' action on the environment (Cohen 1978: 43–4). Evidently, therefore, the human 'handling' of animals is quite different from the handling of tools. If anything, it can be compared to the craftsman's handling of raw material; but whereas the craftsman's aim is to realise a particular form, the trainer aims to establish a particular pattern of skilled behavioural responses.

In fact, animal domestication very often does involve the use of manual tools, but of a kind we have not so far encountered. They are tools of coercion, such as the whip or spur, designed to inflict physical force and very often acute pain (see Chapter Four, p. 73). Another class of tools consists of those attached to the animals themselves and operated as part of their performance. Thus the 'handling' of animals is really a two-stage operation in which the human master, through the use of the instruments of coercion, aims to control the skilled tool-using performance of his charges. Indeed there is an immediate and obvious parallel here with slave-driving: like human slaves, similarly compelled to work through the infliction of pain, animals constitute labour itself rather than its instruments (Ingold 1980: 88). Both humans and animals can, however, be virtually
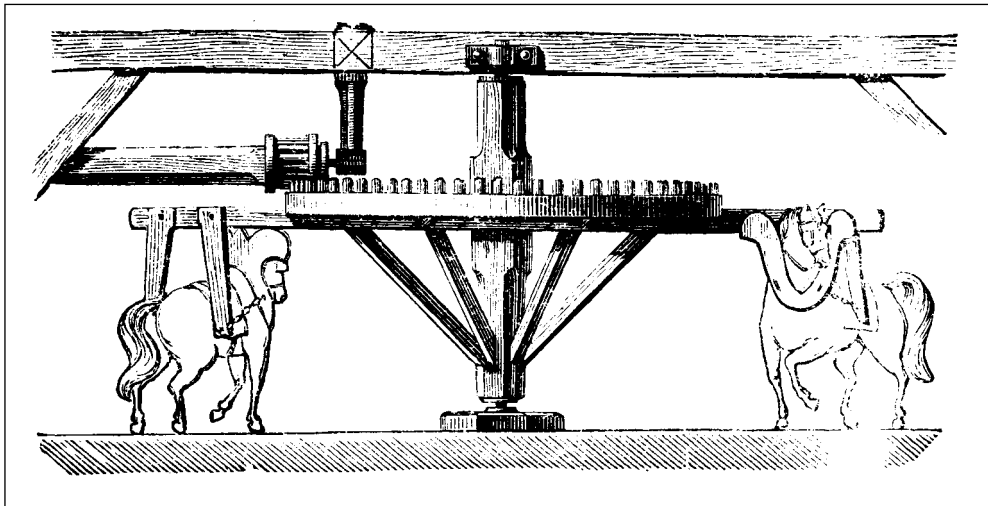
Figure 15.6 Gin-horses.

From F. Reuleaux, *The kinematics of machinery*, published by Macmillan, 1876, p. 501.

reduced to a machine existence through the systematic repression of their powers of autonomous action. Thus, Mumford dates the 'first complex, high-powered machines' to some five thousand years ago; they were composed of thousands of human bodies regimented in 'corpselike obedience' to an absolute despotic authority. Such was the 'megamachine' that constructed the Egyptian pyramids (Mumford 1966: 312). Moreover, there is little difference in principle between the oarsmen of the Roman slave-galley, chained to their benches so that they have no other possibility of movement, and the gin-horses depicted in Figure 15.6 (from Reuleaux 1876: 509).

Reuleaux writes: 'the locomotive has often been called a steam-horse – we may reverse the comparison and call the gin-horse . . . the locomotive of the machine which it drives' (1876: 508). Perhaps in no other employment has an animal come closer to being converted into a pure machine, functioning simply as a prime-mover. Harnessed to the apparatus, the horses have become parts of a closed kinematic chain, whose motions – just like those of the grindstone in Figure 15.4 – are precisely predetermined. Yet if the beasts really were machines as Cartesian philosophy would have us believe, converting oats into tractive effort, it would not be necessary to shield them from extraneous sensory inputs, for example by covering their eyes with blinkers. After all, the difference between the horse and the locomotive is that, barring mechanical failure, locomotives do not bolt, take fright, or simply decide to stop. As Marx shrewdly notes, the great disadvantage of horses as a motive force for industry, quite apart from the high costs of maintenance, lies in the fact that 'a horse has a head of its own' (1930: 397). In short, the essential difference between the human mastery over animals and over machines is that although both – in terms of Reuleaux's definition – 'can be compelled to do work', the machine is compelled by the very nature of its construction whereas the animal is compelled by the external imposition of coercive force. The Cartesian equation of animals and machines may have served to justify their use as mechanical prime movers, but is belied by the repressive techniques that had to be applied in fitting them to this role.

Manufacture and machinofacture

We have seen how, in man- or animal-powered machines, the living body becomes an integral part of a complete determining system. Turning now to systems in which the prime-mover is an artificial motor mechanism, such as a steam-engine, what role is left to the human operator? Does he become, in Marx's phrase (1930: 408,451), no more than a 'living appendage' of the machine? Not quite, for it is a fact that the best-constructed system of automatic machinofacture, even if provided with a continuous supply of fuel and raw materials, would soon grind to a standstill without human attention. This is simply because machines, unlike living organisms, are not self-maintaining systems, and are incapable of making up themselves for the effects of wear and tear. As Marx himself admits, machine repair and maintenance call for skilled craftsmanship, but the mechanics and engineers who ply this craft 'comprise a superior class of workmen', having a higher status (and higher pay) than the mass of the factory workforce whose principal task is to keep the machines supplied. Considering the latter alone Marx notes how – at the time he was writing, in the middle of the nineteenth century – machinofacture had led both to a prolongation of the working day and to the homogenisation of the workforce. The former was possible because, excepting breakdowns, machine power can be kept going indefinitely, whereas man must have his food and rest. The latter was a result of the replacement of human skills by the determining motions of the machine. Moreover, once

human motive force was dispensable, women and children – whose muscle power and endurance were deemed inferior to men's – became equally employable.

With regard to the relation between machines and their operators, it is vital to distinguish the influence of capitalist relations of production from the effects of mechanisation and automisation. Consider the following statements, which appear on the same page of *Capital* and which – on the face of it – seem directly contradictory:

1 In manufacture and in handicrafts, the worker uses a tool; in the factory he serves a machine;
2 In [all kinds of capitalist production] the worker does not use the instruments of labour, but the instruments of labour use the worker. However, it is only in machine production that this inversion acquires a technical and palpable reality.

(Marx 1930: 451)

By 'manufacture' Marx is referring to the largely pre-industrial phase of capitalist production, stretching roughly from the middle of the sixteenth century to the end of the eighteenth. The characteristic feature of such manufacture was the assembly, within a single workshop, of a large number of highly specialised, skilled artisans performing complementary tasks within a rigidly prescribed division of labour. These artisans, however, did not co-operate of their own accord, for their association was a result not of relations among themselves but of each having contracted to the same employer who commanded the sum total of their labour-power. In effect it was he who 'co-operated' the working capacities of his employees, much as in a later period, the factory-owner would 'co-operate' the working machines that eventually took over each of the functions originally performed by hand (Marx 1930: 400–1).

In this sense of co-operation, which appears equally applicable to both labour-power and machinery, we also find the sense in which, according to statement 2 above, instruments 'use' their operators. What is meant is that the will or purpose that the instrument serves to realise is not that of the worker but that of the employer. The worker who operates the instrument acts under a form of compulsion, ultimately backed by the threat of withdrawal of the means of subsistence. From the employer's point of view, tools are not made to be used by workers, rather workers are made to use tools. Moreover this 'making' does not only exist in the element of compulsion. For unlike the craftsmen of earlier ages, who might apply their skills to a range of tasks or commissions, the detail worker of capitalist manufacture is rigidly trained to the performance of one limited operation within the overall production system. Through its endless repetition, he 'converts his whole body into the automatic specialized instrument of that operation' (Marx 1930: 356). Given that these bodily aptitudes are largely acquired by long and enforced training on the job, it might reasonably be said that instruments not only use their operators, but make them as well. Combined together on the workshop floor, the aggregate of technically specialised bodies constitutes what Marx calls 'the living mechanism' of manufacture. Naturally, it invites comparison with the 'lifeless mechanism' of machinofacture, constituted by the assemblage of machines in the industrial factory (1930: 356, 451).

In this comparison, presented schematically in Figure 15.7, we regain the sense in which – according to the first of the two statements cited above – the detail worker nevertheless *uses* his tool. In the employment of hand tools, 'the movements of the instrument of labour proceed from the worker' (Marx 1930: 451); the tool does not itself prescribe the envelope of it movement. Yet it is this envelope that determines the form of the product
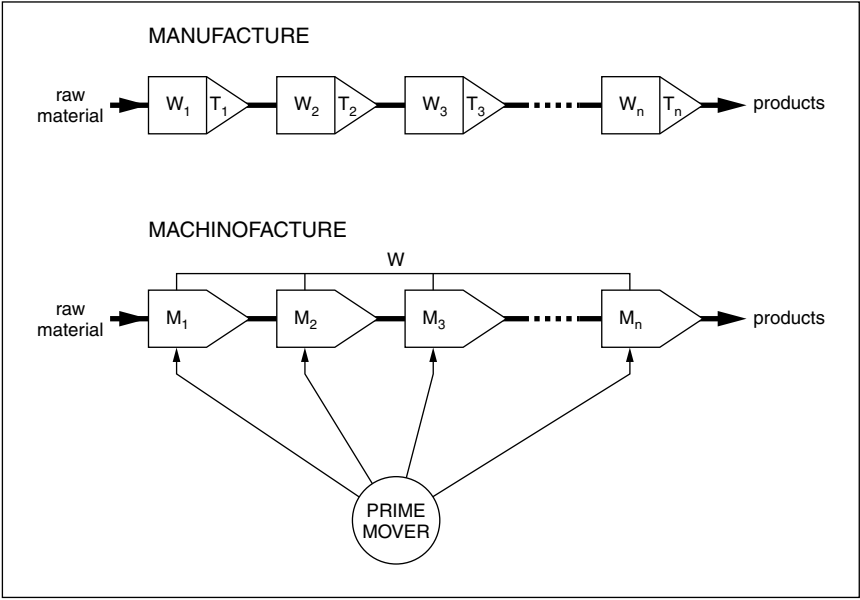
Figure 15.7 The organisations of manufacture and machinofacture.

W_1 – W_n detail workers
T_1 – T_n manual tools
M_1 – M_n detail machines

that will be passed on, as material, to the next worker down the line. Thus the worker must already have some conscious idea of the form he sets out to reproduce, and must be able to translate that idea – through acquired sensorimotor skills – into the movements of hand and tool. In machinofacture, however, the situation is quite otherwise, for the shape of the product is already 'written in' to the machine, the movements of which are predetermined. The consciousness of the machine operative is, so to speak, short-circuited. Though the worker probably knows, if only from prior observation, what the product will look like, he does not actually need to know, and the product's materialisation is not at all dependent on such knowledge.

The organisation of the labour-process in manufacture is thus an organisation at once of specialised bodies and of trained minds, and rests on technical knowledge and skills possessed by the workers themselves. As this knowledge and these skills are replaced by the machine, the co-operation of workers – no longer differentiated in their tasks and therefore freely interchangeable among successive stages of production – is reduced from a complex to a simple form. In 'serving' the machine, factory workers are made to feel their subordination to capital in a way that the detail worker of the manufacturing period did not. For whereas the productive organism in manufacture, composed of sentient and intelligent human beings, has an essential subjective component, this 'no longer exists in the case of machine production. Here the whole process becomes objective, is considered in and by itself, analysed into its constituent phases; and the problem of carrying out each detail process, and of combining the various partial processes, is solved by the technical application of mechanics, chemistry, etc.' (Marx 1930: 402). That is to say, technique has

been replaced by technology, 'rule-of-thumb methods by the purposive application of natural science' (1930: 408).

Marx's point that mechanisation transforms the organisation of production from the 'purely subjective' to the 'purely objective', thereby transferring human agency from the centre to the periphery of the fabricative process, brings us back to the question with which I began. Do machines make history?

CONCLUSION

The answer must surely be that they do not. The suggestion that they might derives from a particular reading of Marx's theory of history, encapsulated in his summary statement that 'in the social production of their existence, men inevitably enter into definite relations, which are independent of their will, namely relations of production appropriate to a given stage in the development of their material forces of production' (1970: 20). Whether he actually meant by this, and other similar statements, 'that the basic trajectory of human history is explained by the advance of the productive forces' (Shaw 1979: 171) is a moot point, but let us suppose for the sake of argument that this was his intention. What he certainly did not intend was the equation of productive forces with machinery, even allowing for the inclusion within the complete machine of human motive force and the raw material on which it operates. As Shaw points out, 'the forces of production are, for Marx, thoroughly human' (1979: 158), in the sense that they include not just muscle-power but every aspect of man's capacity to work. In handicrafts and manufacture this capacity is founded, as we have seen, in the knowledge, skill and experience of human subjects. Thus, the forces of production, as Marx himself wrote, may be 'subjective, appearing as qualities of individuals, as well as objective' (1973: 495). And later he refers to the 'degree of development of the material (and hence also the intellectual) forces of production' (1973: 502). It is unlikely that he meant to *exclude* 'intellectual' forces from 'material' ones', since his concept of the material was constituted by its opposition to the social rather than to the mental (Cohen 1978: 47).

Once human consciousness is admitted as a force of production, we have to conclude that 'people, as much as or more than the machine . . . make history' (MacKenzie 1984: 477). Indeed the burden of Marx's argument is that this history has involved a progressive *objectification* and *externalisation* of the productive forces, reaching its apotheosis in the industrial automaton. As the outcome of this process, machines have not so much made as been made *by* history, one in which human beings, to an ever increasing extent, have become the authors of their own dehumanisation.

Society, nature and the concept of technology

INTRODUCTION: TECHNOLOGY AND SOCIETY

For many centuries, Western thought has been dominated by the idea that the mission of mankind is to achieve mastery over nature. The world of nature is commonly characterised by its opposition to the essential condition of humanity, whose purest expression is taken to be civil society. My starting point in this chapter is the observation that the meaning of 'technology', as currently understood in the West, is firmly fixed within this polarity of society and nature. It is important to recognise from the outset, however, that terms such as society, nature and technology are far from mere labels, in themselves harbouring no moral, political or evaluative commitment. Of the concept of society, it has been observed that to use it is not to denote a thing but to make a claim (Wolf 1988: 757). Similarly, if we want to know what words like nature and technology mean, then rather than seeking some delimited set of phenomena in the world – as though one could point to them and say 'There, that's nature!' or 'that's technology!' – we should be trying to discover what sorts of claims are being made with these words, and whether they are justified. In the history of modern thought these claims have been concerned, above all, with the ultimate supremacy of human reason. Thus society is considered to be the mode of association of rational beings, nature the external world of things as it appears to the reasoning subject, and technology the means by which a rational understanding of that external world is turned to account for the benefit of society.

   Now to the evolutionary anthropologists of the eighteenth and nineteenth centuries it appeared self-evident that societies differed in the degree of cultivation of their powers of reason, in the scope of their understanding of the natural world, and hence also in the extent to which they were able to bend the forces of nature to their own will. The more 'civilised' the society, and the more complex its technology, the more complete was thought to be its mastery or control over nature; conversely in 'primitive' societies, with simple technologies, control over nature was thought to be weak or non-existent. The most primitive societies of all, of course, were those of so-called 'savages', hunter-gatherers who had yet to achieve that basic level of control marked by the domestication of animals and plants. Such people were supposed to live wholly at the mercy of the vicissitudes of nature, and thus to represent the absolute antithesis of Western industrial man who, through the rational application of scientific knowledge, had at last subjugated nature to his sovereign will. And for those who saw technology as the driving force of social development, the simplicity of technology among primitive hunter-gatherers accounted for the rudimentary nature of their social organisation, just as the advanced industrial technology of the West was supposed to underwrite a complex social structure.

In contemporary anthropology, we have become used to treating such arguments with suspicion. We cite examples of societies in which an apparently simple technology is found side by side with systems of kinship and ritual of the utmost complexity. There is, we say, no single measure of social advancement; a society may score highly on one criterion but low on another. Technology is a Western preoccupation, but Australian Aborigines are preoccupied with kinship: neither kinship nor technology furnishes a universal scale of complexity. If Westerners belittle Aborigines on account of the simplicity of their technology, Aborigines are equally entitled to belittle Westerners on account of their primitive notions of kinship. As Franz Boas wrote long ago, 'we have simple industries and complex organisation', as well as 'diverse industries and simple organisation' (1940: 266–7). This denial of any necessary link between technology and society or culture has since become enshrined in the dominant relativistic credo of modern cultural anthropology (Pfaffenberger 1988: 243).

Yet despite the anthropological critique of the evolutionist doctrine of technologically-driven progress, no-one seems to doubt that there is a sphere of capability in every human society that can be identified by the concept of technology, and that in primitive societies (and above all in societies of hunters and gatherers) it may be characterised by its relative simplicity. Indeed in their self-conscious and often contrived attempts to avoid the derogatory connotations of the notion of primitiveness, anthropologists are inclined to qualify their references to 'simple societies' with the rider that 'simple' denotes *technological* simplicity, and carries no immediate implications as regards social organisation and culture. Thus we are told that hunting and gathering is essentially a technological regime, and that we are not entitled to draw conclusions from the rudimentary nature of this technology about the form or elaboration of the social relations in which its practitioners are engaged. It is meaningless, it is said, even to speak of 'hunting and gathering societies' as a class, since these societies have nothing more in common than the purely contingent fact that their members hunt and gather for their subsistence, possessing neither domestic herds nor crops.

Two views that are diametrically opposed often turn out to be so because they are based on common premises, and this is certainly the case with the opposition between evolutionism and relativism that I have sketched out above. On one side, in brief, are those who claim that the essential institutional forms of society are dictated by the requirements of operating a technological system of some given degree of complexity, and therefore that social change is driven by – and depends upon – technological change.[1] On the other side are those who hold that technology exerts no influence upon the form of a society, beyond setting outer limits on the scope of human action. Within those limits, society and culture are said to follow their own historical course, irrespective of the nature or complexity of the technological system. Not only, however, do both sides suppose that technology can be scaled in terms of degrees of complexity; they also share the assumption that technology comprises an objective system of relations among things, that is wholly *exterior* to the social domain of relations among persons. The impact of technology on society may be affirmative or neutral, its formulae prescriptive or permissive, but in itself technology has no part in society: it is simply given as an independent, external factor.

Having thus been placed outside of society and culture, technology could – so far as most anthropologists were concerned – be safely ignored. It was considered to be just one of those things, like climate or ecology, that may or may not be a determining factor in human affairs, but whose study can be safely left to others. As climate is for meteorologists and ecology for ecologists, so technology is for engineers. The study of technological

processes was not seen as an integral part of the study of social relations, or of the study of those systems of meaning that go by the name of culture, and indeed anthropology lacked any framework of concepts or theoretical ideas in which to handle such processes. The result is that until very recently, insofar as technology appeared in anthropological accounts at all, it generally did so in the form of lists or inventories, catalogues of tools and techniques which – however valuable in themselves as documentary records – bore a purely descriptive purpose. Even today, and despite an upsurge of interest fuelled by the revolution in computing and telecommunications, the study of technology remains one of the least developed aspects of anthropological scholarship (a view shared, *inter alia*, by Lemmonier 1986, Pfaffenberger 1988, 1992, and Hornborg 1992).

Now it is precisely the notion that society and technology are external to one another that I wish to challenge. In my view, far from being a timeless datum of the human condition, this externality is a product of history, and a relatively recent one at that. It has emerged in the West, in the last few centuries, hand in hand with what could be called a 'machine-theoretical' cosmology. We cannot, I think, retroject into history or prehistory the modern separation of society and technology, nor can we impose it on non-Western societies, without seriously distorting our understanding of them. My thesis, in a nutshell, is that in the societies we study – perhaps even including our own – technical relations are embedded in social relations, and can only be understood within this relational matrix, as one aspect of human sociality. Two further claims follow: first, that what is usually represented as a process of complexification, a development of technology from the simple to the complex, would be better seen as a process of externalisation or of disembedding – that is, a progressive cutting out of technical from social relations. Secondly, the modern concept of technology, set up as it is in opposition to society, is a product of this historical process. If that is so, we cannot expect to find a separate sphere of human endeavour corresponding to 'technology' wherever we choose to look.

To put my case in the strongest possible terms: *there is no such thing as technology in pre-modern societies*. Let me add at once that I do not mean that people in such societies lack tools or technical skills. My point is that the concept of technology, at least in its contemporary Western usage, sets out to establish the epistemological conditions for society's control over nature by maximising the distance between them. Focusing in particular on societies of hunters and gatherers, I shall show that through their tools and techniques hunter-gatherers strive to *minimise* this distance, drawing nature into the nexus of social relations, or 'humanising' it. This 'drawing in' has as its object to establish the conditions not of control but of a kind of mutualism. In this, the tool delivers a force that is personal rather than mechanical. Hence technical relations, far from being set apart from social relations, are embedded in them.

Before proceeding further, I should perhaps add that the critical strategy I am adopting is a well-tried one in anthropology. Substitute the term 'economy' for 'technology', and everything I have said would be well in tune with most recent thinking in economic anthropology. Over the last two or three decades, anthropologists have been at pains to show how 'economy' and 'society' became institutionally separated in the history of Western capitalism, how the category of the economic is itself a product of this history, how in pre-capitalist societies economic relations are embedded in social relations, and how – with the development of market-oriented capitalism – economic life was progressively disembedded from social life (Polanyi 1957, Sahlins 1969, Godelier 1972: 92–103, Dumont 1986: 104–12). All that I am doing is to extend the same kind of argument to the concept of technology, which up to now has escaped the critical attention that has been devoted to the

concept of economy. I believe this critical work is an essential first step in building a coherent and theoretically informed anthropology of technology, one that takes us beyond the mere cataloguing of tools and techniques from cultures around the world.

Tools, techniques and technology

In the last chapter, I distinguished between technique and technology in terms of whether human powers of perception and action are either immanent in, or detached from, the processes by which things get made. In line with this distinction, in what follows I shall take technique to refer to *skills*, regarded as the capabilities of particular human subjects (see Layton 1974:3–4), and technology to mean a corpus of generalised, objective knowledge, insofar as it is capable of practical application. Both technique and technology must, of course, be distinguished from *tools*. A tool, in the most general sense, is an object that extends the capacity of an agent to operate within a given environment. But you do not necessarily have to use a tool to implement a technique. It is a fundamental mistake, as Marcel Mauss (1979; 104) recognised, to think that 'there is technique only when there is an instrument'. In the hands of a hunter or warrior the spear may be a tool for bringing down game or wounding an adversary, but in the hands of the athlete the flight of the javelin becomes an end in itself. He uses no instrument to augment his throw, yet he still has his technique.

   Why is it, then, that in both specialised anthropological and popular Western discourse, it tends to be assumed that technical activity is *ipso facto* tool-using activity? Consider, for example, Roy Ellen's definition of subsistence technique: 'a combination of material artefacts (tools and machines) and the knowledge required to make and use them' (1982: 128). Here, technique is regarded not as a property of skilled subjects, but as an inventory of instrumental objects together with their operational requirements. This view, I believe, results from a conflation of the technical with the mechanical, a conflation that lies at the very core of the modern concept of technology. For as we saw in the last chapter, what this concept does, in effect, is to treat the workman as an *operative*, putting into effect a set of mechanical principles that are both embodied in the construction of the instruments he uses, and entirely indifferent to his own subjective aptitudes and sensibilities. In other words, productive work is divorced from human agency and assigned to the functioning of a device. Thus, technique appears to be 'given' in the operational principles of the tools themselves, quite independently of the experience of their users. If all technical activity is tool-using activity, it is because the technique is seen to reside, outside the user, in the tool, and to come 'packaged' – like the instruction manual for a piece of modern machinery – along with the tool itself.

   My contention, to the contrary, is that technique is embedded in, and inseparable from, the experience of particular subjects in the shaping of particular things. In this respect it stands in sharp contrast to technology, which consists in a knowledge of objective principles of mechanical functioning, whose validity is completely independent both of the subjective identity of its human carriers and of the specific contexts of its application. Technique thus places the subject at the centre of activity, whereas technology affirms the independence of production from human subjectivity. Drawing out the contrast, Carl Mitcham notes that

   . . . tools or hand instruments tend to engender techniques, machines technologies . . .
   Technique is more involved with the training of the human body and mind . . . , whereas

technology is concerned with exterior things and their rational manipulation . . . Techniques rely a lot on intuition, not so much on discursive thought. Technologies, on the other hand, are more tightly associated with the conscious articulation of rules and principles . . . At the core of technology there seems to be a desire to transform the heuristics of technique into algorithms of practice.

(1978: 252)

Now it is commonly supposed that where there are techniques there must be technology, for if skill lies in the effective application of knowledge, there must be knowledge to apply (Layton 1974). I believe this view to be mistaken. For acting in the world is the skilled practitioner's way of knowing it. It is in the direct contact with materials, whether or not mediated by tools – in the attentive touching, feeling, handling, looking and listening that is entailed in the very process of creative work – that technical knowledge is gained as well as applied. No separate corpus of rules and representations is required to organise perceptual data or to formulate instructions for action. Thus, skill is at once a form of knowledge and a form of practice, or – if you will – it is both practical knowledge and knowledgeable practice. Moreover as a form of knowledge, skill (or technique) is different in kind from technology. The former is tacit, subjective, context-dependent, practical 'knowledge how', typically acquired through observation and imitation rather than formal verbal instruction. It does not therefore have to be articulated in systems of rules and symbols. Technological knowledge, by contrast, is explicit rather than tacit, objective rather than subjective, context-independent rather than context-dependent, discursive rather than practical, 'knowledge that' rather than 'knowledge how'. It is, besides, encoded in words or artificial symbols, and can be transmitted by teaching in contexts *outside* those of its practical application.

Historically, as the skilled manipulation of tools has given way to the operation of mechanically determined systems, knowledge of the first kind has been gradually devalued, whilst knowledge of the second kind has come to be regarded as increasingly indispensable. Far from complementing technique by providing it with a foundation in knowledge, technology has forced a division between knowledge and practice, elevating the former from the practical to the discursive, and reducing the latter from creative doing or making to mere execution. To see this, one has only to compare the classical, Aristotelian notion of *tekhnē*, with its connotation of skilled craftsmanship, with the modern idiom in which to say of practice that it is 'purely technical' is to intimate that it is merely mechanical. In the dichotomy between discursive knowledge and executive practice, no space remains for the practical knowledge (or knowledgeable practice) of the craftsman. Technology, in short, appears to erase technique, rather than to back it up.

Moreover the transition from technique to technology, on the level of knowledge, has its precise counterpart, on the level of material instruments, in the transition from the tool to the machine. Recall that in the classical conception, *tekhnē* referred to the skilled making of the craftsman, while *mēkhanē* referred to the manually operated devices that assisted its application. But now, just as technology has been removed from the sphere of practitioners' personal knowledge and experience, so the machine has come to signify the independence of technical operations from human sensibility. Overall, then, the evolution from the classical dualism of *tekhnē/mēkhanē* to the modern dualism of technology/machine has been one in which the human subject – both as an agent and as a repository of experience – has been drawn from the centre to the periphery of the labour process. In other words, as I have tried to show schematically in Figure 16.1, it has been a movement from the personal to

the impersonal. I now intend to demonstrate that this movement is tantamount to a dis-embedding of technical relations from their matrix in human sociality, leading to the modern opposition between technology and society.

THE TECHNICAL AND THE SOCIAL

It is commonplace in anthropology to draw an absolute distinction between the domains of technical and social phenomena. This doubtless owes much to the influence of Emile Durkheim. The earliest anthropological reference to the distinction that I know is to be found in a tantalising footnote to the conclusion of Durkheim and Mauss's essay of 1903 on *Primitive Classification*, where they write of what they call 'technological classifications' as vague and unsystematic constellations of ideas, quite unlike the systematically interconnected categories of scientific classification which are grounded in the structure of social groups. Scientific classifications, Durkheim and Mauss write,

> are very clearly distinguished from what might be called technological classifications. It is probable that man has always classified, more or less clearly, the things on which he lived, according to the means he used to get them: for example animals living in the water, or in the air or on the ground. But at first such groups were not connected with each other or systematized. They were divisions, distinctions of ideas, not schemes of classification. Moreover, it is evident that these distinctions are closely linked to practical concerns, of which they merely express certain aspects.
>
> (1963: 81–2, fn. 1)[2]

Figure 16.1 The transition in knowledge and devices from the personal to the impersonal, associated with the substitution of the modern dichotomy of technology/machine for the classical dichotomy of *tekhnē/mēkhanē*.

What is important for my present argument is the way technological classification is linked here to the experience of individuals in practical activity, as opposed to the structuring force of society. From the start, technology was placed firmly on the individual side of a pervasive dichotomy between individual and society, while science was set apart on the social side.

In the subsequent elaboration of the Durkheimian paradigm, the distinction between technology and science was referred back to that between magic and religion, the former issuing from the individual and pragmatic in intent, the latter issuing from society and fundamentally expressive. The same distinction was later taken up by Edmund Leach, in a series of attempts to force a division between *technical* and *ritual* types or aspects of behaviour. Leach defines technical behaviour in purely pragmatic, means–ends terms: it 'produces observable results in a strictly mechanical way'. Ritual behaviour, by contrast, is essentially communicative, and serves to convey information, in a symbolic code, about group membership or social identity (Leach 1966: 403: cf. 1954: 12, 1976: 9). The division, then, is between a mechanics of technical systems and a semiotics of social systems. All practical action is 'fully mechanical' in the sense that its effects are entirely predictable

from its initial conditions (1976: 23), whereas all social action, since it is designed to communicate a state of affairs but not to change it, is inherently non-practical.

To illustrate the effects of applying this conceptual framework across the board of human societies, let me return to the case of hunters and gatherers. It comes as no surprise that the usual anthropological characterisation of the activities of hunting and gathering as 'purely technical' carries the implications that they are not only 'fully mechanical' but also residually *non*-social. Thus the work of subsistence production is effectively removed from the sphere of social action, becoming merely a 'need-satisfying process of individual behaviour' (Sahlins 1972: 186 fn. 1). When human beings hunt and gather, even when they do so in co-operation, they can act only in their 'natural' capacity as individuals, rather than as social persons. 'Given such a distinction', as Gísli Pálsson has shown, 'production must take place in nature. The appropriation of nature only becomes social when the resources extracted from nature enter relations of sharing or exchange among groups' (Palsson 1991: 8). If, as Durkheim maintained, there are two parts to a man, the individual and the social being, it is apparently the individual who hunts and gathers, and the social being (as a member of a more inclusive group) who shares (Ingold 1988a: 275, cf. Durkheim 1976: 16). In Leach's terms, every act of hunting and gathering would be a mechanical event, and every act of sharing a communicative or semiotic event.

This view of the separation of production and distribution has been reinforced by a peculiarly Durkheimian reading of the distinction, taken from Marx, between social relations and technical forces of production, according to which these constitute mutually exclusive domains. Representing a widely held position in Marxist anthropology, Jonathan Friedman has written that 'the social relations of production are not, nor can they be, technical relations' (1974: 447). Included in the latter are the forces mechanically exerted by human bodies, when set to work, whether singly or in conjunction. Relations of co-operation in the tasks of hunting and gathering are thus built into the operation of the technical system – they are *technical* relations, part of the organisation of work, as distinct from the *social* relations activated in the distributive practices of sharing. Yet as Marx surely recognised, the externalisation of the forces of production was a historical consequence of the development of the machine. Where, as in hunting and gathering, food production depends on the skilled handling of tools, and indeed of one's own person, the productive forces appear as the embodied qualities of human subjects – as their technical skills. Such qualities cannot be generalised: whereas a technology is indifferent to the personhood of its operators, techniques are active ingredients of personal and social identity. Thus the very practice of a technique is itself a statement about identity; there can be no separation of communicative from technical behaviour.

Our conclusion must be that in hunting and gathering societies, the forces of production are deeply embedded in the matrix of social relations. That is to say, the 'correspondence' between technical forces and social relations is not external but internal, or in other words, the technical is one *aspect* of the social. The modern semantic shift from technique to technology, associated with the ascendance of the machine, is itself symptomatic of the disembedding of the forces of production from their social matrix, transforming the correspondence between forces and relations of production from the internal to the external, and setting up the now familiar opposition between technology and society. For as I have already shown, the concept of technology signifies the withdrawal of the person from production, which is consequently reduced to the operation of a quasi-mechanical system comprising human bodies, instruments and raw materials. If persons, human subjects, are external to production, then the sphere of social relations

(between persons) must be external to the sphere of technical relations which, if they involve human beings at all, involve them as the bearers of natural and not personal powers (on this distinction, see Shotter 1974: 225).

The danger is that we are inclined to read back into history the modern separation of technology and society, identifying the forces of production with all that is external to the human subject. Hence we imagine the primitive precursors of the machine to have been such items of material culture as the hand-axe, spear and digging-stick. And this, in turn, leads us to view technical evolution as a process of complexification, accompanied perhaps by a simplification in the social spheres of kinship and ritual. However the machine is not simply a more advanced substitute for a tool, nor were hand-tools the original forces of production. For the development of the forces has transformed the entire system of relations between worker, tool and raw material, replacing subject-centred knowledge and skills with objective principles of mechanical functioning. In short, and to reiterate the conclusion of my argument from the last chapter, technical evolution describes a process not of complexification but of *objectification* of the productive forces.

This result suggests a radical recasting of the relation between technology and kinship. Instead of seeing an evolution in parallel, in which the former becomes ever more dominant and elaborate as the latter declines in significance, the view I have proposed suggests that the technical forces of production were originally *consubstantial* with the social relations of kinship. Only subsequently, as kinship was disengaged from the organisation of production, did the forces 'split off' and acquire separate institutional identity as a technology. At the same time the objectives of production were themselves transformed from the constitution of persons to the manufacture of things. In short, to find the antecedents of technology, we should look to the sphere of artifice, contained in social relations, rather than to the artefacts of material culture (Ridington 1982: 470).

WHAT TOOLS ARE FOR

The next step in my argument is to show how this view of the embeddedness of technical in social relations affects our understanding of the nature and use of the tool. In itself, of course, the tool is nothing (Sigaut 1993: 383). 'Being a tool' is not at all the same as, say, 'being a stone' or 'being a piece of wood'. For whereas the latter refers to intrinsic properties of the object itself, the former refers to what it affords for a user. An object – it could be a stone or a piece of wood – *becomes* a tool through becoming conjoined to a technique, and techniques, as we have seen, are the properties of skilled subjects. The presence of such a subject is already presupposed in our description of the object as a tool of a certain kind. Thus the tool is not a mere mechanical adjunct to the body, serving to deliver a set of commands issued to it by the mind; rather it extends the whole person. Indeed there is a certain parallel between the use of tools in production and the giving and receiving of gifts in exchange. The tool has an impact on raw material, as the gift has an impact on its recipient, only so long as it is animated by an *intention* that issues from the person of the user or donor. Divorced from the context of production, the tool reverts to its original condition as an inert object; likewise the gift is inert outside the social context of exchange (Mauss 1954[1925]: 10). Both tool and gift mediate an active, purposive engagement between persons and their environments.

Returning to hunters and gatherers, we can ask how this mediation is effected in the context of their relations with their environments. As Robin Ridington (1982: 471) has pointed out, hunter-gatherers 'typically view their world as imbued with human qualities

of will and purpose'. From their perspective, tools are like words: they mediate relations between human subjects and the equally purposive non-human agencies with which they perceive themselves to be surrounded. Thus the tool, as I showed in Chapter Four (p. 72), is a link in a chain of personal rather than mechanical causation, which serves to deliver intentional action and not merely physical or bodily force. Moreover, unlike herdsmen and farmers, whose tools are used to establish some degree of domination over their environments, hunters and gatherers do not regard their tools as instruments of control. Thus in hunting, it is commonly supposed that the animal gives itself to be killed by the hunter who, as a recipient, occupies the subordinate position in the transaction. The spear, arrow or trap serves here as a vehicle for opening or consummating a relationship. If the arrow misses its mark, or if the trap remains empty, it is inferred that the animal does not as yet intend to enter into a relationship with the hunter by allowing itself to be taken. In that way, the instruments of hunting serve a similar purpose to the tools of divination, revealing the otherwise hidden intentions of non-human agents in a world saturated with personal powers of one kind and another. In short, whereas for farmers and herdsmen, the tool is an instrument of control, for hunters and gatherers it would better be regarded as an instrument of revelation.

This understanding that hunters and gatherers have of their relations with non-human components of their environments is fundamentally at odds with that basic premise of Western thought with which I began, that the destiny of humankind is to achieve domination over nature. 'In our traditional ways of thinking', as Winner writes, 'the concept of mastery and the master–slave metaphor are the dominant ways of describing man's relationship to nature, as well as to the implements of technology' (1977: 20). Viewed from this perspective, hunters and gatherers appear to be engaged in a struggle for existence which, on account of the simplicity of their material equipment, is not yet won. For them, nature remains untamed. Yet herein lies a paradox. For if technology implies the human control over nature, and if the condition of hunter-gatherers – or more generally of 'primitive man' – is the absence of such control, how can there be such a thing as 'primitive technology'?

Though the paradox is never stated so explicitly in the literature, the solution comes through clearly enough. It is to assume that hunter-gatherers are engaged in the operation of a system of forces which is none other than nature herself, viewed – characteristically, in Western eyes – as a vast, all-encompassing mechanism. Tied to the workings of this mechanism, they are regarded as subservient to nature in much the same way that, in the modern era, industrial workers are subservient to the artificially engineered machines of the factory. It follows that hunter-gatherer technology is seen to be grounded in the properties of the natural world just as Western technology is embodied in the artificial machine. Both delimit a set of production possibilities that are given prior to, and independently of, the persons of the producers. It is for this reason that the forces the hunter-gatherer operates are commonly denoted by the hybrid 'techno-environmental'. Where for everyone else, technology is supposed to be on the side of Man against Nature, for hunters and gatherers it appears to be on the side of Nature against Man, revealing in its application the hegemony of natural law rather than the dominance of human society and its interests. This, incidentally, is a view shared equally by both advocates and opponents of so-called 'techno-environmental determinism'. Advocates argue that technology and environment together determine social form, opponents argue that social form is independent of techno-environmental constraint, but both take it for granted that 'techno' is something that is intrinsically linked to environmental conditions, rather than an imposition of society.

My solution to the problem of whether technology lies on the side of nature or human society is simply to dispense with the dichotomy, and with it the concept of technology that is predicated on this dichotomy. The paradox then promptly disappears. What we have in reality are human beings, living and working in environments that include other humans as well as a variety of non-human agencies and entities. Through their experiences of dealing with these various components of the environment, persons develop with specific aptitudes and sensibilities, that is as bearers of techniques. Reciprocally, through the deployment of their technical skills, people actively constitute their environments. But in this mutually constitutive interrelation between persons and environment there is no absolute dichotomy between human and non-human components. There are techniques for engaging with fellow humans just as there are techniques for engaging with the animals and plants on which life depends, or with materials such as wood, clay or stone in the making of equipment. Any or all of these techniques may involve the use of tools. However these tools, as I have shown, are intended not to control but to reveal. And they are used not in a failed attempt to achieve emancipation from an alien world of nature, but in a successful attempt to draw the inhabitants of that world into an unbounded sphere of intimate sociality.

CONCLUSION

Hunters and gatherers have secured their place in Western thought as the bearers of a simple technology, as representatives of the original baseline from which a gradual process of complexification eventually culminated in the advanced technologies of the modern world. I have argued, to the contrary, that the concept of technology is itself a product of a modern machine-theoretical cosmology. One is inclined to see, in its indiscriminate extension to society at large, a particular instance of the more general anthropological fetishisation of culture, another Western concept which we have turned upon others as a mirror of our own superiority. People in 'primitive' or 'traditional' societies are made to appear as though their practical activities were entirely bound to the operation of technology, as their thought to the precepts of their culture, the one providing material support for the other. Technology and culture, twin pillars of the modern ideals of progress and enlightenment, confine the rest of humanity to the monotonous execution of determining systems: as technology determines practice, so culture determines thought.

Once the concept of technology is unpacked it is evident that its application distorts our understanding – above all of hunting and gathering societies – in the following ways:

1 Technique is detached from the practical experience of human subjects and ascribed to the properties of an instrumental apparatus, of which people are but mechanical operators.
2 Technical activity is partitioned off from social activity, and likewise production is separated from distribution as issuing from individuals and social persons respectively.
3 Technical forces are grounded in an environment conceived as 'nature', an alien and dehumanised presence that seems to dictate the terms of accommodation.

The principal conclusions of my argument are really two-fold. The first, reinforcing my thesis in Chapter Fifteen, is that technical evolution has to be seen as a process not of complexification but of objectification and externalisation of the forces of production. The second, related conclusion is that in the course of this evolution, technical relations have

become progressively disembedded from social relations, leading eventually to the modern institutional separation of technology and society. The implications for anthropology are that we can no longer follow the Durkheimian precedent of taking this separation for granted, nor can the concept of technology remain immune from critical scrutiny. It is high time to restore technique to its rightful place alongside economy, politics, religion and kinship as a proper object of social anthropological inquiry.

Chapter Seventeen

Work, time and industry

Much anthropological discussion is couched in terms of a pervasive opposition between 'Westerners' and other, 'non-Western' people. Amongst other things, it is argued that Westerners have a specific attitude to time and work that is not shared by people in non-Western societies. I want to propose here that while the concepts of time and work have indeed acquired specific meanings through their implication in such key historical transitions as the rise of capitalism and the growth of industrial manufacture, there is nevertheless a sense in which none of us are Westerners, and that the challenge that non-Western perspectives present to Western modes of apprehension exists at the very heart of our *own* society, in the mismatch between our shared experience of dwelling in the lived-in world and the demands placed on us by external structures of production and control that seem to leave only a residual space, divorced from culture and social life, where we can truly be ourselves.

   I shall proceed as follows. First, I consider the attitudes to work and time of people in 'traditional' or pre-industrial societies who still retain a large measure of control over the rhythms of their working lives. For such people, I suggest, time is intrinsic to the array of specific tasks that make up the pattern of quotidian activity of a community. I go on to show how the formal logic of capitalist production undermines this task-orientation by establishing an absolute division, in principle, between the domains of work and social life. This division, however, does not naturally conform to experience but is rather enforced, to varying degrees, against a resistance founded in the inevitability of people's mutual involvement in the concrete settings of practical activity. The very instruments – above all the industrial machine and the clock – that in theory serve to disengage the time and work of production from the current of social life, are in practice reappropriated by their operators in the process of production, not of commodities for the market, but of their own personal and social identities. To exemplify this point, I shall draw on some studies of one particular category of industrial workers, namely locomotive drivers. In conclusion, I argue that if we find the time-awareness of people in societies other than our own hard to grasp, this is not because it is strange to our experience, but rather because the political, economic and ideological apparatus of the 'West', with its peculiar conjunction of individual freedom and clockwork necessity, has made us, in a sense, strangers to ourselves.

Task-orientation

Speaking of people in so-called primitive societies, Cato Wadel has observed that what is characteristic of these societies 'is not that activities we term as work are not conceptualised, but that these activities are conceptualised *in association with* social relations' (Wadel

1979: 380). Or as Sahlins puts it, 'a man works, produces, in his capacity as a social person, as a husband and father, brother and lineage mate, member of a clan, a village' (1968: 80). To see an activity as thus embedded in a social relation is to regard it as what I shall call a *task*. And of all the manifold tasks that make up the total current of activity in a community, there are none that can be set aside as belonging to a separate category of 'work', nor is there any separate status of being a 'worker'. For work is life, and any distinctions one might make within the course of life would be not between work and non-work, but between different fields of activity, such as farming, cooking, child-minding, weaving, and so on.

The same point applies quite generally in the pre-industrial world (Godelier 1980). In Ancient Greece, for example, 'we do not find the idea of one great human function, work, encompassing all the trades, but rather that of a plurality of different ones, each constituting a particular type of action with its own particular product' (Vernant 1983: 272). Every artisan trade – with its specific instruments, raw materials and products, its technical operations and the qualities required of its practitioners – was a separate system rather than part of an all-embracing division of labour. If there was any overarching division, it was not between work and leisure, but rather between the spheres of making and doing, *poiesis* and *praxis*, a division that subordinated the crafts of manufacture to the activities – including farming and warfare – of those who used the implements made.

What holds for the generalised category of work holds also for that of time. It is commonly observed, in ethnographic accounts of non-industrial societies, that the people described lack any concept that would correspond exactly to the idea of time current in the West. Here, for example, is Evans-Pritchard, writing in a justly celebrated passage about Nuer pastoralists of southern Sudan:

> The Nuer have no expression equivalent to 'time' in our language, and they cannot, therefore, speak of time as though it were something which passes, can be wasted, saved, and so forth. I do not think that they ever experience the same feeling of fighting against time or of having to co-ordinate activities with an abstract passage of time, because their points of reference are mainly the activities themselves, which are of a leisurely character. Events follow a logical order, but they are not controlled by an abstract system, there being no autonomous points of reference to which activities have to conform with precision. Nuer are fortunate.
>
> (Evans-Pritchard 1940: 103)

Among the Nuer, then, as much more generally in the pre-industrial world, time is inseparable from the everyday round of activities. It is not something objective and external, *against* which tasks may be measured or *on* which they can be located, since it has no existence apart from the tasks themselves. Thus for the Nuer, 'the daily timepiece is the cattle clock, the round of pastoral tasks, and the time of day and the passage of time through a day are to a Nuer primarily the succession of these tasks and their relation to one another' (pp. 101–2).

We may speak, then, of a *task-orientation* in such societies, an orientation in which both work and time are intrinsic to the conduct of life itself, and cannot be separated or abstracted from it. If you want to say *when* something happened, you do so by relating it to another regular activity that took place concurrently – for example, 'so-and-so arrived in the camp at milking time'. And if you want to say *how long* it took for something to happen, you do so by comparing it with how long something else takes. In a pioneering

though now rather dated work on primitive time-reckoning, the Swedish anthropologist Martin Nilsson wrote that

> To indicate the duration of time, primitive peoples make use of other means, *derived from their daily business*, . . . in Madagascar, 'rice-cooking' often means half an hour, 'the frying of a locust', a moment. The Cross River natives say: 'The man died in less than the time in which maize is not yet completely roasted', i.e. less than about fifteen minutes; 'the time in which one can cook a handful of vegetables'.
>
> (Nilsson 1920: 42)

Likewise in a classic paper about which I shall have more to say presently, the historian E. P. Thompson notes that in Medieval England, duration could be expressed by how long it took to cook an egg, say a prayer, or (apparently) to have a pee – though this latter time-span, known as 'pissing while', does seem 'a somewhat arbitrary measurement' (Thompson 1967: 58).

I have spoken of tasks as socially embedded activities, but should pause to explain more precisely what I mean. First and foremost, tasks are activities carried out by persons, calling for greater or lesser degrees of technical skill. Machines do not perform tasks, but people do. Thus with a task-orientation the human subject, equipped with a competence acquired through practising alongside more experienced hands, is situated right at the centre of productive activity. Secondly, tasks are defined primarily in terms of their objectives, without necessarily entailing any explicit codification of the rules and procedures to be followed in realising them. And these objectives, far from being independently prescribed in the form of exercises in problem-solving (as in the entirely artificial tasks of 'testing' in the school or psychological laboratory), themselves arise through the agent's involvement within the current of social life. Thirdly, the particular kinds of tasks that a person performs are an index of his or her personal and social identity: the tasks you do depend on who you are, and in a sense the performance of certain tasks *makes* you the person who you are. And finally, tasks are never accomplished in isolation, but always within a setting that is itself constituted by the co-presence of others whose own performances necessarily have a bearing on one's own. In other words, every task exists as part of what I have called a *taskscape*, understood as the totality of tasks making up the pattern of activity of a community (for an elaboration of this concept, see Chapter Eleven).

Now if, in traditional societies, time is intrinsic to tasks, and if tasks are the technically skilled activities of particular persons with particular social identities, then it must follow that there can be no real distinction between work and social life, and moreover that time is the movement or flow that inheres equally in both. What kind of time is this, that is thus inherent in the taskscape? Sociologists Pitrim Sorokin and Robert K. Merton, in a landmark paper dating from 1937, called it *social time*. I have already introduced this concept in Chapter Eleven (pp. 195–7), and will not elaborate further here save to stress again its inherent rhythmicity and its embeddedness in activities that are indexical of a person's belonging to locality and community (Sorokin and Merton 1937: 628). It is important to emphasise, too, that the rhythmic structure of social time emerges not only from the interweaving and mutual responsiveness of human movements, but also from the way these movements resonate to the cycles of the non-human environment. Traditionally, people had to *fall in* with the rhythms of their environment: with the winds, the tides, the needs of domestic animals, the alternations of day and night, of the seasons, and so on, in accordance with what the environment afforded for the conduct of their

daily tasks. As a song of the Kabyle peasant farmers of Algeria puts it: 'It is useless to pursue the world, no-one ever overtakes it' (Bourdieu 1963). Similarly in Ancient Greece, the work of farming was regarded as a form of participation in an order at once natural and divine, and the artisan who supplied the farmer with his tools worked to a design that was inscribed within this order, and that was revealed in the raw material rather than artificially superimposed upon it (Vernant 1983: 248–63). In short, the world *opens itself out* to the traditional artisan or farmer, in both its form and its temporal rhythms, through his or her action in it.

The idea that human industry can run ahead of nature, and in so doing, transform it, belongs to the modern era of Western thought (Godelier 1980: 834). For the goal of modern technology has been to override the constraints of the natural world, to bring its forces under control, so that the rhythms of society can be brought into conformity with an imposed, artificially contrived schedule. Activities can now go on – as we say – 'around the clock'. Developments in the fields of transport and communications have had a decisive impact in this regard, though probably no single innovation has been of greater consequence than the electric light. The effect was to instal a new kind of time as the dominant regulator of human activity. Corresponding to what Sorokin and Merton (1937: 621) called astronomical or *sidereal* time, it is the time spun by the orbital motions of the planets, or by a perfectly functioning mechanical clock. As I shall now show, there is an intimate logical connection between this form of time and the estimation of work in terms of the generalised concept of labour.

THE TEMPORAL LOGIC OF CAPITALIST PRODUCTION

In 1967, E. P. Thompson published what has become a classic study of the effects of industrial capitalism on people's attitudes to time and work. After reviewing a great deal of evidence, he concluded that 'Mature industrial societies of all varieties are marked . . . by a clear demarcation between "work" and "life"' (1967: 93). Of course he does not mean that workers are not alive when they work. The distinction being drawn here between living and working is really one between what *we* do, and what we are *caused* to do; between action that issues from ourselves as responsible social agents, and action that stems from the pressing of various trained capacities into the service of a project that is not ours but is subject to the dictates of an alien will. It is a corollary of this view that life in an industrial society is lived in the activities of consumption rather than production, in the ways in which people take possession of, and use, the goods acquired with the money they earn. This implies that to understand the processes of social life in such a society we have to focus above all on what people are doing in those periods of each day when they are *not* under contract to an employer – that is, 'after business hours' (Sahlins 1968: 80).

The separation between the domains of 'work' and 'social life' is, in fact, a formal entailment of the logic of capitalist production. The defining principle of capitalism is the alienation of labour-power – the need for a certain class of people, lacking direct access to the means to procure a livelihood, to sell or rent out their very capacity to work to an employer, who owns the means of production, in return for a money wage with which they can purchase the wherewithal for their subsistence. People who have thus sold their capacity to work, their labour-power, are conventionally identified (within this context of capitalist class relations) as 'workers', and the activities in which they engage during that period when their labour-power is under the command of an employer who has appropriated it are likewise identified as 'work'. In this situation, labour-power has become a

commodity that, like other commodities, can be bought and sold. Moreover the worker, in person, is in principle divorced from the activity of production, since in that very activity his capacity to work is under the command not of himself but of an employer. It follows that the domain of work relations, in which the labour-powers of several workers are combined in the factory or on the shop floor, is quite distinct from the domain of social life, in which workers may relate to one another as *persons*: as members of communities and as occupants of social roles. This is not to say that there are no social relations in the workplace, or to deny that they may exist side by side with co-operation in the labour process. It is to claim, however, that social relations are not themselves *constituted* by such co-operation.

How, following this formal logic, are we to understand the meanings of work and time in the context of industrial capitalism? Following the example of Marx (1930: 10–11), we might compare the work of the tailor with that of the weaver. Not only do they produce qualitatively different things (coats and linen), but also tailoring and weaving are activities of quite unlike kinds, calling for different skills, tools and materials. Yet as exchangeable commodities, we might nevertheless find that one coat is 'worth', say, twenty yards of linen. The value in which this worth consists cannot be in any way particular to coats, linen or anything else. It is rather value-in-general, a kind of worth that is common to all commodities but peculiar to none. Conventionally such value is expressed in terms of money, for money is a special kind of commodity that has no other use than as a medium of exchange. But by the same token, it should in principle be possible to compare tailoring and weaving, not as qualitatively different *kinds* of activity, but as varying *amounts* of 'activity-in-general'. So what is this activity: the lowest common denominator of all productive tasks that is nevertheless particular to none?

Marx, rather misleadingly, called it 'abstract social labour'. That labour is an abstraction, of the same order as value-in-general, is not in doubt. Yet what are relegated in the abstraction are precisely those situationally specific features of the practical contexts of engagement, with persons and materials, in which skills are acquired and deployed. The work of the tailor can be considered substitutable for that of the weaver only by cutting it out from the matrix of social relations within which it takes on its specific form. That specific, socially embedded form is what I have called a task. Now I have already observed that tasks do not exist in isolation but only as part of an interlocking array, a taskscape. Like the array of useful things (or use-values) that ordinarily clutter any inhabited environment, the taskscape is qualitative and heterogeneous (see Chapter Eleven, pp. 194–5). Labour, by contrast, like value-in-general, is quantitative and homogeneous. And in the reduction of the one to the other, effected by the logic of capitalist relations, the sociality of work is dissolved.

What, then, is the common measure by which different tasks may be reckoned to represent equivalent amounts of labour? The answer, of course, is *time*; but it is time of a particular sort – sidereal rather than social, to recall Sorokin and Merton's (1937) distinction. Now a certain task, say in weaving, will lead to the production of a particular object or use-value, say a length of linen. But if the work of the weaver is regarded not as a specific kind of task but as a determinate amount of labour, it will be represented in hours. And likewise, if the linen is regarded not as a specific kind of object but as a determinate amount of value, it will be represented in currency. Consequently, a certain time of labour has produced a certain moneysworth of goods. Or in short, time is money.

The phrase 'time is money', with its implication that time is something that can be spent or saved, used profitably or wastefully, hoarded or squandered, is a product, then,

of the commodification of labour that accompanied the rise of industrial capitalism (for some of its metaphorical ramifications, see Lakoff and Johnson 1980: 7–9). Among the first to use the phrase was Benjamin Franklin, himself one of the major architects of the view of man as *Homo faber*, or nature-transformer. In 1751 he related the following story:

> Since our Time is reduced to a Standard, and the Bullion of the Day is minted out into Hours, the Industrious know how to employ every piece of Time to a real Advantage in their different Professions. And he that is prodigal of his Hours, is, in effect, a squanderer of Money. I remember a notable Woman, who was fully sensible of the intrinsic Value of *Time*. Her husband was a shoemaker, and an excellent Craftsman, but never minded how the Minutes passed. In vain did she inculcate to him, *That Time is Money*. He had too much Wit to apprehend her, and it prov'd his ruin. When in the Alehouse among his idle Companions, if one remark'd that the Clock struck Eleven, *What is that*, says he, *among us all*? If she sent him Word by the Boy, that it had struck Twelve; *Tell her to be easy, it can never be more*. If, that it had struck One, *Bid her be comforted, for it can never be less*.
>
> (cited in Thompson 1967: 89)

Let me recapitulate the argument in brief. With industrial capitalism, labour becomes a commodity measured out in units of time, goods become commodities measured out in units of money; since labour produces goods, so much time yields so much money, and time spent in idleness is equivalent to so much money lost. The result is not only a demarcation between work (time that yields money) and leisure (time that uses it up), but also a characteristic attitude to time as something to be *husbanded*. Thompson calls this attitude 'time-thrift' (1967: 83–4).

Tasks, labour and leisure

Thompson's thesis is that with the rise and maturation of industrial capitalist society, the task-oriented time of pre-industrial rural and urban life was gradually replaced by a regulation of production governed by the clock. In Sorokin and Merton's terms, this represents a transition from 'social time' (equivalent to Thompson's task-oriented time) to 'sidereal time' (equivalent to Thompson's clock time).

Task-orientation, as I have already mentioned, is person-centred, so that the experience of time is intrinsic to the performance of skilled activity. But with the rise of capitalist industry, so the theory goes, the person is withdrawn from the core to the margins of the labour process, and hence also the time inherent in personal experience and social life is *disembedded* from the time of work or production. This latter kind of time thus appears objective and impersonal, *extrinsic* to social relations, and governed by laws of mechanical functioning that have no regard for human feeling. It is, of course, the time of the *clock*. For just that reason, Lewis Mumford famously claimed that the clock was the archetypal machine, and that it was the clock rather than the steam engine that heralded the birth of the machine age (Mumford 1967: 286). For the aim of the industrial employer, having appropriated the labour-power or capacities to work of his employees (for a given number of hours each day), is to put together these capacities – on the factory floor or assembly line – into an efficient, working mechanism. And he does so by subjecting their operations to a precise and impersonal clockwork regimen. In many industries, such regimens of work were in place long before the advent of machine automation.

But the identification of the sphere of production with the ascendancy of clock time generates the expectation that the alternate sphere of consumption should be identified with a quite different kind of time, precisely opposed to clock time as individual freedom is opposed to mechanical constraint. This is what is colloquially called 'free time', and it is the time associated with what we call 'leisure' when this is defined by its *contrast* to work. Free time is the time we experience (or rather, think we experience) when we turn inwards on ourselves in the hedonistic pursuit of purely individual satisfactions: it is the time of that archetypal creature of neoclassical economics, the isolated consumer. In reality, of course, this creature is a figment of the imagination, for no-one consumes in isolation. For the same reason, free time is not so much something we actually experience as a category by which our experience is discursively represented, in contexts where we wish to draw attention to the space of our own private and subjective selfhood as against the regulative structures of public life whose temporality is epitomised by the clock.

The individual, in this discourse, is supposedly caught in a perpetual oscillation between work in the public domain of production and leisure in the private domain of consumption. Regulated by clock time in the former,

TIME: Task-oriented time (social) → 'Free time' *vs.* Clock time (sidereal)

ACTIVITY: Tasks (work = life) → Leisure (private) *vs.* Work (public)

PRODUCTION: *Tekhnē/Ars* (art = skilled practice) → Art (individual creativity) *vs.* Technology (mass production)

EXCHANGE: Prestation → 'Pure gift' *vs.* Market mechanism

DWELLING PERSPECTIVE   **COMMODITY PERSPECTIVE**

Figure 17.1 The opposition between the dwelling perspective and the commodity perspective in the spheres of time, activity, production and exchange.

he or she retreats into the sanctuary of free time in the latter. In a society dominated by the impersonal structures of the machine and the market, the sphere of leisure seems to offer a residual space for the spontaneous and purely individual expression of selfhood. Moreover the oppositions between work and leisure, and between clock time and free time, have exact homologues in other fields. There is a close connection, for example, between the ideally spontaneous expression of selfhood and the modern Western notion of artistic creativity, which is likewise opposed to the industrial technology of mass production as novelty is opposed to replication. And in the field of exchange, the privacy and spontaneity of the self is closely linked to the ideology of the 'pure gift', as an expression of individual feeling, by contrast to the impersonal 'market mechanism' regulating the exchange of commodities. Thus gifts are to commodities as art is to technology, as leisure

is to work, as free time is to clock time. This series of oppositions is depicted in the right hand column of Figure 17.1.

What, then, has been the fate of task-oriented time in industrial society? Has it given way to an exhaustive division between free time and clock time? Before beginning to answer this question, we should note that the task-orientation of traditional societies also has its homologues in other fields. Thus in the field of production, the traditional notion of art as socially situated skilled practice, epitomised by the classical Greek *tekhnē*, and by its Latin equivalent *ars*, preceded the subsequent bifurcation into the opposed notions of art and technology, just as the classification of activities by task preceded the division between leisure and work. And the prestations of traditional societies, about which Mauss wrote so eloquently in his *Essay on the Gift* (1990[1950]), are neither spontaneous expressions of individual generosity nor market-regulated contracts but have as their objective the production of social relations in community. It is possible, therefore, to argue for an evolutionary progression, from a traditional state of affairs in which work is inseparable from life, and characterised by task-orientation with its attendant socially situated skills and prestations, to a modern condition in which every aspect of human life is split by a master dichotomy between freedom and necessity, to yield the series of oppositions spelled out above. Figure 17.1 summarises this argument.

I propose here to argue to the contrary. I do not believe that task-orientation has disappeared with the transition to industry: it persists, perhaps especially in those contexts in which we claim to be 'at home'. Indeed, one way of delineating the meaning of 'home' in our society might be as a domain in which activities are thought of primarily in terms of tasks. But the very ambiguity of this concept suggests two possible approaches to the continuing significance of task-orientation in industrial society. On the one hand, home may be thought of as a domain of activity that has remained relatively impervious to capitalist relations of production – a relic of the householding economy of the pre-industrial era kept alive by capitalism for the purposes of reproducing the labour force. On the other hand, home may represent a certain perspective on the world, which I have called the perspective of *dwelling*. Its focus is on the process whereby features of the environment take on specific local meanings through their incorporation into the pattern of everyday activity of its inhabitants. Home, in this sense, is that zone of familiarity which people know intimately, and in which they, too, are intimately known. As such, it encompasses all the settings of everyday life: whether the house, street, neighbourhood, or place of work.

Of the two approaches suggested by these alternative meanings of 'home', one entails a qualification of the evolutionary argument, the other a more radical critique. I shall start with the first and then move on to the second, with which I identify my own position.

TIME AND EXPERIENCE IN THE HOUSEHOLD AND THE WORKPLACE

The domain of householding, although by no means confined within the four walls of the house or dwelling, was until quite recently (though less so today) centred upon the figure of the housewife, who certainly used to enjoy no division between work and leisure. For her, work was indeed life, and consisted in a multitude of tasks of child-rearing and domestic maintenance. Moreover unlike the industrial worker, the housewife remained formally in command of her own working capacity: although her work was necessary and unavoidable, often punishing in its demands of energy and endurance, it was *not* done under external imposition. Thus the housewife and her sense of time, as Thompson

recognises, hold out as exceptions to his general thesis, which correlates the rise of industrial capitalism with a one-way transition from task-oriented to clock time:

> Despite schooltimes and television times, the rhythms of women's work in the home are not wholly attuned to the measurement of the clock. The mother of young children has an imperfect sense of time and attends to other human tides. She has not yet altogether moved out of the conventions of 'pre-industrial' society.
>
> (1967: 79)

Here, then, is the qualification: notwithstanding industrialisation, task-orientation continues to thrive in the domestic domain, as a kind of survival from the pre-industrial age, albeit one that is destined to disappear in due course.

If this qualification is accepted, then so long as the household continues to be a focus for social reproduction, we need to consider the dialectical interplay *between* the task-oriented time of the home and the clock time of activities in the workplace. There are two points about this that we can note immediately. First, the distinction falls – or at least used to fall – to some extent along lines of gender and generation, with women and children more committed to task-oriented time and men more committed to clock time. In the past, an obvious indication of this was that men, and not women and children, carried clocks or watches. If a woman or child wanted to know what the time was by the clock, they had to ask a man. Secondly, there can be scheduling conflicts between the two kinds of time which can cause quite severe disruptions within the household. The routine of domestic and community tasks has to fall in with local environmental conditions, whereas industries and bureaucracies run to a universal clock time which can co-ordinate production, transport and commerce on a national or even international scale, but only at the expense of riding roughshod over local variations. Below, I shall present an example of the problems that can arise in this connection, concerning the family life of locomotive drivers.

Is the incongruence between task-oriented and clock time, as the qualified evolutionary argument outlined above suggests, confined to the household – or, more broadly, to the local community? Has task-orientation been banished by the inexorable logic of the capitalist mode of production from the workplace? Is it really so, as theory dictates, that workers lose touch with the rhythms of their own bodies as soon as their physical powers, placed in the service of capital, are subordinated to the imposed, mechanical regimen of the production line? In his discussion of the alienation of labour under capitalism, included in the *Economic and Philosophic Manuscripts of 1844*, Marx protested with all the rhetorical force he could muster that this is indeed the case. Having surrendered his capacity to work to an employer, the worker 'only feels himself outside his work, and in his work feels outside himself. He is at home when he is not working, and when he is working he is not at home' (1964: 110). Now by 'home', Marx clearly meant something more than a person's place of abode. Setting off to work in the morning, a man not only leaves his dwelling but also, in a much stronger sense, *ceases to dwell*. He is not himself: as his activity no longer belongs to him, so too he is a stranger to the world whose forms and meanings are created through this activity.

Viewed from the perspective of the factory owner, workers may indeed appear as no more than extensions of the total apparatus of production, and their activity as the mere operation of a set of mechanical principles – that is, a technology – embodied in the construction of the machinery employed. This, as we saw in Chapter Fifteen, was the

image that Marx invoked when he spoke of operatives as being treated like 'living appendages' of the 'lifeless mechanism' of the factory (Marx 1930: 451). The experience of the workers themselves, however, is a different one. For in their concrete presence, machines are substantial components of the immediate environment, and engaging with them is an inevitable part of the business of everyday coping in the world. Thus rather than simply operating a technology, the activity of industrial workers consists in *coping with machines*. And viewed in this light, such activity not only belongs to them, but also calls for a good measure of skill, of a kind that can only be acquired through experience on the job. Moreover it is through the development of skills of coping that workers are able to resist the impositions of a regime of command and control that would seek to reduce their activity to nothing more than the operation of an external system of productive forces. It is true that the machinery that workers are required to operate may – on account of its noise, heat, vibration or whatever – strain the human body to its limits of tolerance. However, despite Marx's claim to the contrary, the worker does not cease to dwell in the workplace. He is 'at home' there. But home is often a profoundly uncomfortable place to be.

I have already observed that machines do not perform tasks; only people do. The operation of technology, with or without inputs of human labour-power, is a machine performance. Coping with machines, on the other hand, entails a multitude of tasks, calling for specific aptitudes and sensibilities, which occupy the attention of workers on the shop floor. It is as persons, not as units of labour-power, that they engage with the industrial equipment around them, and the meanings that this equipment holds for them arise within the context of that engagement. Here, then, we rediscover task-orientation at the very heart of industrial production, in the workplace. For this discovery, I am indebted to François Sigaut, who has pointed out that as fast as machines have been contrived to do what had previously been done by skilled hands, different skills have sprung up for handling the machines themselves. He calls this the 'law of the irreducibility of skills', in the light of which 'the entire history of technics . . . might be interpreted as a constantly renewed attempt to build skills into machines by means of algorithms, an attempt constantly foiled because other skills always tend to develop around the new machines' (Sigaut 1994: 446). For precisely the same reason, task-orientation is indestructible. And everything I have said about tasks in general applies more specifically to the skilled handling of industrial machines in the process of coping. It is person-centred, it follows implicit 'rules of thumb' rather than explicitly codified procedures, its objectives are set within the current of activity among all those involved in the work situation rather than following directives laid down from above, it is continually responsive to the other activities that are going on around it, and – most importantly – it is constitutive of personal and social identity.

In short, whereas the operation of technology produces commodities for the owner of capital, coping with machines is part of the process of producing the worker as a skilled social agent. The same activity may be viewed from both perspectives, but it is the latter, grounded in the lived experience of engagement with the material paraphernalia of industry, that is the perspective of dwelling. And in the incongruence between these perspectives, of dwelling and commodity production, lies also the tension between the time of tasks and of the clock. We are inclined to speak of workers on an assembly line as being subjected to the regimen of clock time, while forgetting that the mechanism of the clock drives only the hands on its face, not the hands of the workers whose routine it allegedly controls. The ability to co-ordinate one's movements with the passage of time as measured

by the clock is an acquired skill, and the co-ordination is itself a task that is carried on alongside all the other tasks of social life. Clocks are a ubiquitous feature of the environment of people in industrial society, who have to learn to cope with them, just as they must cope with other kinds of machines. But the time intrinsic to the experience of coping with clocks is not itself clock time. We may seek to attune our activity so that it resonates with the repetitions of the clock, or to gain an intuitive 'feel' for hours, minutes and seconds, but that does not turn our bodies into pieces of clockwork.

Having recognised that task-orientation is no mere survival from the pre-industrial age, but that it flourishes at the core of industrial production in workers' activities of coping with machines, the way is open for an analysis of industrial society couched in terms of the concepts listed in the left hand column of Figure 17.1. In particular, we can note that exchanges in the workplace, involving mutual assistance or co-operation in the tasks of coping, are conducted between persons, and that as such – like the customary prestations of traditional societies – they are constitutive of social relations instead of distinct from them. One might even argue, following the lead of Mauss rather than Marx, that the relations among factory workers resemble those of gift exchange:

> When such employees transact with one another as part of their work, they are morally obligated to do so and are transacting not as individuals but as parts of a social web that identifies them and their relationships and obligations to one another. Furthermore, the objects and services that employees transact with one another remain linked with the employees, because workers and what they transact have identities based on their places within the encompassing firm.
>
> (Carrier 1992: 202–3)

The implication of my argument, however, is that the dynamic of industrial society can be understood neither from the dwelling perspective represented by the left-hand column of Figure 17.1, nor from the commodity perspective represented by the right-hand column. It lies instead in the dialectical relation between these two perspectives.

In terms of the geometry of the figure, people in industrial society are caught in a 'horizontal' oscillation, not in a 'vertical' one, but it is an oscillation that incorporates the whole series of dichotomies in the right-hand column as one of its poles. From one perspective there is free time and clock time, from the other all time is task-oriented. From one perspective there is work and leisure, from the other all life consists of tasks. From one there is creative art and the operation of technology, from the other, skilled practices. And from one there are pure gifts and market contracts, from the other, socially situated prestations. But the move from left to right does not represent an evolutionary transition from tradition to modernity. The dwelling perspective has not been *replaced* by the commodity perspective. Indeed the whole thrust of my argument is to the contrary – namely that task orientation, with its attendant socially situated skills and prestations, is the primary condition of our being at home in the world. As such, it constitutes the baseline of sociality upon which the order of modernity has been built, and from which we have now to come to terms with it.

THE LIFE AND TIMES OF LOCOMOTIVE DRIVERS

I should like to exemplify some of the points made above by referring briefly to studies of one particular category of industrial workers – namely, locomotive drivers. They were

the subject of a classic paper by the American sociologist W. F. Cottrell, published in 1939 under the title 'Of time and the railroader'. Cottrell paints a vivid picture of how the railroader is a slave to time. The railway system is, in effect, an extension of the assembly line of the factory; for example in automobile manufacture the various components may have to be brought from widely dispersed parts of the country, and if any one of these supply lines breaks down the entire operation founders. The stakes, then, are high, and everything depends on precise timing. Though at the time when Cottrell was writing, United States law stipulated that every engineer should have 8 hours' rest out of every 24, for the remaining 16 hours of each day he was constantly on call. Wherever he went he carried a watch, which was required to be checked for accuracy twice a year. The result, Cottrell writes, was an 'intense time-consciousness that marks the railroader in all his social relationships' (1939: 195).

But this very commitment made it difficult for the railroader to engage in *any* social relationships beyond those of the immediate family. Being constantly on call, he could not time-plan for other relationships. Frederick Gamst, in a more recent study of American railroad engineers ('hogheads') that confirms many of Cottrell's findings, vividly depicts the uncertainties of one of his informants, Slim Rogers, about participation even in family events. Would he be able to watch his son in a crucial baseball game?

> As usual, the hoghead promised nothing but said he would have to see how close he would be to his call, if he were not already on the road . . . Regrettably he had already missed his oldest son's graduation from junior high; maybe he would be able to make it for the graduation of the younger one. The only thing Slim could depend on was attending his own funeral, as he was once told by an old hoghead at the top of the seniority list. 'Then you'll have all the time in the world, Sonny,' the old head remarked.
>
> (Gamst 1980: 113)

By and large, then, the railroader's leisure activities were limited to solitary, individual recreations that called for no collaboration with others. But precisely because the field of his social relations was perforce so limited, the significance of close family ties was for him exceptionally great, so that his home life – when he *was* at home – was lived with a peculiar intensity.

Relations with the local community, partially mediated by the children of the family, were conducted almost entirely by the railroader's wife. For her, the family represented not a domain of retreat into privacy and solitude, but a point of entry into a wider network of community ties. But she would frequently experience scheduling conflicts between the demands of the children and of community affairs on the one hand, and her obligations towards her husband on the other. They might, for example, call for quite different mealtimes.

It would seem, in this example, that the railroader is oscillating between work and leisure, between the public clock time which regulates the railway system and the free time experienced in the privacy of his home or in the solitude of individual recreation. The housewife, on the other hand, perceives time as task-oriented and founded in the social relations of household and community. And the demands of the community do not necessarily coincide with those of the clock. All of this conforms rather neatly with the qualified evolutionary model, as elaborated in the previous section. The reality, however, may not be that simple. Two more recent studies of railway workers offer some clues as to why this should be so.

The first is by L. S. Kemnitzer, who speaks from his own experience as a railroad conductor in the mid-sixties, some 35 years after Cottrell was writing. He found that, by then, railroad workers no longer identified so closely with the temporal values of the work. That is, the importance of time-keeping for the operation of the railroad system was not matched by an 'intense time-consciousness' of the kind Cottrell had described. The reason for this lay in a general loss of identification with the job, resulting from rationalisation and automation – including the use of diesel engines, computer programming and radio communication. Thus while the accuracy of timing continued to be as important as ever, most personnel were no longer required to carry watches, and these were less regularly checked. However Kemnitzer goes on to emphasise the continuing importance of quite another sense of time, one tied closely to specific tasks and the embodied skills necessary to carry them out. This, so-called 'switching time' lies in the 'ability to integrate time, distance, and subjective estimates about weight, slope and speed in making decisions about the movement of cars and engines in switching' (Kemnitzer 1977: 27). Birgitta Edelman's study of shunters in a Swedish railway yard similarly stresses the importance of skilful estimations and perfect timing in allowing the work to 'flow' without accident (Edelman 1993). But here, rationalisation had proceeded still further. According to a new and controversial regime, the engines themselves were to be operated by remote control by a shunter standing beside the tracks!

Now the kind of timing to which Kemnitzer and Edelman refer is clearly integral to the railway workers' acquired skill of coping with heavy and potentially dangerous vehicles. Indeed 'switching time' sounds surprisingly similar to the Ancient Greek concept of *kairos*, the moment that must be seized, in the skilled work of the artisan, when 'human action meets a natural process developing according to its own rhythm' (Vernant 1983: 291). According to Vernant:

> In intervening with his tools, the artisan must recognize and wait for the moment when the time is ripe and be able to adapt himself entirely to circumstances. He must never desert his post, . . . for if he does the *kairos* might pass and the work be spoiled.
>
> (1983: 291–2)

Thus switching time, like the *kairos*, belongs to a task-orientation – we could almost say that it is part of the *tekhnē* of shunting. And as Edelman's study reveals, it is threatened by the relentless march of automation. Yet according to Kemnitzer, the process of automation had already brought about the demise of the 'intense time consciousness' described by Cottrell. Was not this time consciousness, too, part of a task-orientation, part of the railroader's ability to cope with the demands of his work?

I believe we misunderstand the railroader's sense of time if we equate it with the subjection of his movements, while on the job, to the mechanical determination of the clock. Were they so determined, he would have no need to carry a watch. What distinguished the experienced railroader was his practised ability to co-ordinate his movements with the indications of his timepiece. He had to be able to catch the right moment to accelerate or apply the brakes, or to judge his speed on a stretch of track, so as to arrive or depart safely and precisely on schedule. This was an acquired skill, and one moreover that was highly valued. The railroader's peculiar capacity to 'keep time' with a precision unmatched by practitioners of other trades conferred on him an identity that, as Cottrell notes, singled him out in all his relationships, both within and beyond the field of his employment. And the watch, as the symbol of this identity, was an object of lavish care and attention

(Cottrell 1939: 190). In the eyes of management, to be sure, the railroad system was conceived as a total technology which, in principle, should run with the predictability of clockwork, and employees were treated merely as means towards that end. But in the experience of the railroader, the watch and its temporal intervals were incorporated and accorded significance within an essentially task-oriented approach to the practical business of driving trains. Time consciousness belonged to the railroader's *tekhnē*.

TIME AND THE OTHER IN INDUSTRIAL SOCIETY

There exists, in the Western anthropological imagination, a specific category which is reserved for people whose form of life is considered to be most perfectly opposed to that of the inhabitants of modern industrial societies. This is the category of 'hunter-gatherers'. According to one rather Arcadian vision of hunter-gatherer society, recently introduced into anthropology under the rubric of 'the original affluent society' (Sahlins 1972: 1–39), their wants are few, and can be satisfied with little work, leaving ample time for leisure, rest and sleep. People work erratically, and on average for no more than three or four hours each day. Lacking foresight or any care for the future, hunters and gatherers consume whatever they have to hand, without trying to ration, save or store. They have, it would appear, made an institution out of indolence.

Now Sahlins's account of hunters and gatherers echoes, almost word for word, the sentiments of the English gentry, in the early days of capitalism, towards the labouring classes – likewise notorious for their alleged indolence and profligacy, their irregular hours, and their propensity to spend whatever they had on instant merriment, gambling or drunkenness. What these two cases have in common – the twentieth-century American anthropologist regarding the hunter-gatherer and the eighteenth-century English gentleman regarding the labourer – is that in both, a way of life is being evaluated in terms of a standard that measures work in hours, and that imposes a clearcut division between work and leisure. On these criteria it is found to be wanting. Indeed to people who are accustomed, as many of us are, to labour timed by the clock, the attitudes to work and time of allegedly traditional or 'primitive' folk, who are not, are almost bound to appear 'wasteful and lacking in urgency' (Thompson 1967: 60).

Yet contemporary captains of industry are still inclined to make surprisingly similar allegations about the incorrigible laziness and inefficiency of working people. To give just one illustration, I return to the ethnography of railway workers, in this case from Britain. I refer to Ken Starkey's (1988) analysis of an industrial dispute between British Rail and ASLEF (the Association of Locomotive Engineers and Firemen). The dispute, which concerned flexible rostering, was not about the duration of the working day – for in this regard there was no further scope for reduction – but about the intensity of work while on the job. The problem was that the Union was committed, by a time-honoured agreement, to the idea of a fixed eight-hour day. British Rail, however, wanted to introduce some flexibility in the length of the working day so that a man might be working more than eight hours on some days, less than eight on others – though with no more and probably fewer hours overall. The rationale for the proposed change was to try to reduce the 'porosity' of the working day, that is, the length of time during which a man might not, in fact, be doing anything but waiting around for the next train. Thus under existing arrangements, the average actual working time for an 8-hour shift was only 3 hours 20 minutes. Flexible rostering would increase the proportion of working time to waiting time within a shift, and by thus reducing the porosity of the working day would raise productivity. Why, then, did ASLEF object?

Quite apart from the fact that it would increase the intensity of work, ASLEF's main objection was that flexible rostering would leave men with much less control than before over the *scheduling* of their personal and social lives. Like the drivers described by Cottrell, who worked to a 16-hour limit but were liable to be called up at any time, ASLEF feared that flexible rostering would undermine railwaymen's ability to time-plan their own relationships outside work, and so would make their social life intolerable. At issue, then, was not the *amount* of time outside work, but control over the *timing* of this time.

In effect, the dispute focused on two ways of looking at time which are by now familiar from my previous discussion. These are the dwelling and commodity perspectives. In the commodity perspective, epitomised by the phrase 'time is money' and represented by the right-hand column of Figure 17.1, time is seen as a quantity to be budgeted, with a clearcut demarcation between work and leisure. Not only did British Rail management hold to this view themselves, they also attributed it to their Union opponents, assuming that their strategy was devised to produce a deal which would give them either more leisure for the same pay, or more pay for the same number of hours of work. For ASLEF, to the contrary, what mattered was the qualitative aspect of time and its significance for social life. Thus ASLEF's objections to the intensification of time use rested more on moral than on economic criteria. On the one hand they perceived the attempt to increase the intensity of time use during the working day as a threat to the traditional conception of locomotive driving as a skilled, almost craft-like activity which, by its very nature, involves a quality of time that is not uniform or homogeneous. On the other hand, they saw the attempt to introduce flexible rostering as a threat to their own social and community lives. In short, theirs was an approach firmly located in the dwelling perspective, represented by the left-hand column of Figure 17.1.

It would perhaps be a little far-fetched to conclude that ASLEF demonstrated a typically hunter-gatherer approach to work and time. Nevertheless, there is more than a passing similarity between Sahlins's portrayal of the intermittent, stop-go pattern of work in hunter-gatherer communities, and British Rail's view of its drivers, as spending the greater part of the working day waiting (chatting, resting, playing cards, drinking cups of tea) between trains. In terms of the actual number of hours worked – if any meaning can be given to such measurements – there is not much difference. It would seem, then, that the opposition between the 'West' and the 'Other' has its source rather closer to home than we might have imagined, and that we do not even have to leave the bounds of our own society in order to discover the challenge presented by supposedly non-Western perspectives to the dominant categories of Western thought. It would be fair to identify these latter categories – including the dichotomies between freedom and necessity, leisure and work, art and technology, the pure gift and the market mechanism, and free time and clock time – with the commodity perspective. However it would be quite wrong, as I have already shown, to conclude that life in modern industrial societies is confined to an oscillation between the poles of these dichotomies – that is, to the right-hand column of Figure 17.1.

An indication of this lies in our response to Evans-Pritchard's depiction of Nuer time, which I cited at the outset. When he tells us that for Nuer, time inheres in the round of daily tasks and their relations to one another, we do not find this strange or exotic. To the contrary, I am sure his words strike in most readers a deep chord of familiarity. We know exactly what he is talking about, because we have all experienced it ourselves, embedded in our memories of childhood, family, home and community. It is not only the basis of our sense of belonging, but also something we value very highly. 'Nuer are

fortunate', says Evans-Pritchard, and we are quick to agree, wishing that we, too, were not harried by the regimen of the clock. In a sense, clock time is as alien to us as it is to the Nuer; the only difference is that we have to contend with it. If we differ from the Nuer, then, it is not because they have a task-orientation and we do not. The difference is rather that we are forced to accommodate this orientation – so fundamental to our personal and social identity, to our knowledge of place and people, and to the practice of our everyday skills – within the straitjacket of a 'Western' or commodity-based institutional and ideological framework that seeks at every turn to deny the reality of situated social experience. We are not Westerners, nor are we really non-Westerners; rather, we are human beings whose lives are caught up in the painful process of negotiation between these extremes, between the dwelling and commodity perspectives. In this process lies the temporal dynamic of industrial society, a dynamic which we – including anthropologists, in their writings – have merely displaced onto the relation between our society and the rest of the world.

Chapter Eighteen

On weaving a basket

Artefacts are made, organisms grow: at first glance the distinction seems obvious enough. But behind the distinction, as I aim to show in this chapter, lie a series of highly problematic assumptions concerning mind and nature, interiority and exteriority, and the genesis of form. We have only to consider the artefactual status of such an everyday object as a basket to realise that the difference between making and growing is by no means as obvious as we might have thought. I shall begin this chapter by showing that the reasons why the basket confounds our expectations of the nature of the artefact stem from the fact that it is woven. If the basket is an artefact, and if artefacts are made, then weaving must be a modality of making. I want to suggest, to the contrary, that we should understand making as a modality of weaving. This switch of emphasis, I believe, could open up a new perspective not just on basketry in particular, but on all kinds of skilled, form-generating practices. But it would also have the effect of softening the distinction between artefacts and living things which, as it turns out, are not so very different after all.

Making and growing

What is implied about artefacts by their characterisation as things that are made rather than things that grow? First of all, a division is assumed between form and substance, that is between the design specifications of the object and the raw materials of which it is composed. In the case of living things, it is supposed that the information specifying the design of an organism is carried in the materials of heredity, the genes, and thus that every new life-cycle is inaugurated with the injection of this specification into a physical medium. But with artefacts, this relation between form and substance is inverted. Form is said to be applied from without, rather than unveiled from within. The very distinction between a within and a without of things, however, implies the existence of a *surface*, where solid substance meets the space of action of those forces that impinge upon it. Thus the world of substance – of brute matter – must present itself to the maker of artefacts as a surface to be transformed.

In commonsense, practical terms, this is not hard to imagine. Many of our most familiar artefacts are (or were, before the days of synthetic materials) made of more or less solid stuff such as stone, metal, wood or clay. The very usefulness of these objects depends on their being relatively resistant to deformation. We ourselves, however, inhabit a gaseous medium – air – which, offering no such resistance, not only allows complete freedom of movement, but also transmits both light and sound. Quite apart from the obvious fact that we need air to breathe, and thus simply to stay alive, the possibilities of movement and perception (visual and aural) that air affords are crucial for any artefact-producing

activity. There is, then, a pretty clear distinction between the gaseous medium that surrounds us and the solid objects that clutter our environment; moreover the patterns of reflected light off the surfaces of these objects enable us to see them for what they are (Gibson 1979: 16–22).

These practical considerations, however, all too easily become confused in our thinking with speculations of a more metaphysical kind. To show why this is so, consider the case of the beehive. Is this an artefact or not? Surely, hives don't grow. Insofar as it results from the application of exterior force to raw material, the hive would appear to be as much 'bee-made' as the human house is 'man-made'. Or is it? Musing on this question, Karl Marx famously came to the conclusion that 'what from the very first distinguishes the most incompetent architect from the best of bees, is that the architect has built a cell in his head before he constructs it in wax'. In other words, the criterion by which the house is truly artificial – and by comparison the beehive only figuratively so – is that it issues from a representation or 'mental model' which has been fashioned in the imagination of the practitioner prior to its execution in the material. We may assume that bees, by contrast, lack the powers of imagination, and have no more conception of their hives than they do of their own bodies, both of which are formed under genetic control (Ingold 1983, cf. Marx 1930: 169–70)

Here, the exteriority of the forces that shape artefacts is understood in quite another sense, in terms not of the physical separation of gaseous medium and solid substance but of the *meta*physical separation of mind and nature. Unlike the forms of animals and plants, established through the evolutionary mechanism of natural selection and installed genetically at the heart of the organisms themselves (in the nucleus of every cell), the forms of artefacts are supposed to have their source within the human mind, as preconceived, intellectual solutions to particular design problems. And whereas organic growth is envisaged as a process that goes on *within* nature, and that serves to reveal its inbuilt architecture, in the making of artefacts the mind is understood to place its ideal forms *upon* nature. If making thus means the imposition of conceptual form on inert matter, then the surface of the artefact comes to represent much more than an interface between solid substance and gaseous medium; rather it becomes the very surface of the material world of nature as it confronts the creative human mind.

This is precisely the kind of view that lies at the back of the minds of anthropologists and archaeologists when they speak of artefacts as items of so-called 'material culture'. The last thing they mean to suggest, in resorting to this phrase, is that in the manufactured object the domains of culture and materiality somehow overlap or intermingle. For nothing about their substantive composition *per se* qualifies artefacts for inclusion within culture. The materials from which they are made – wood, stone, clay or whatever – are in any case generally available in nature. Even with objects manufactured from synthetic materials for which no naturally occurring counterparts exist, their status as items of material culture is in no way conditional upon their 'unnatural' composition. A child's toy made of plastic is no more cultural, on that account, than its wooden equivalent. It is the form of the artefact, not its substance, that is attributed to culture. This is why, in the extensive archaeological and anthropological literature on material culture, so little attention is paid to actual materials and their properties. The emphasis is almost entirely on issues of meaning and form – that is, on culture *as opposed* to materiality. Understood as a realm of discourse, meaning and value inhabiting the collective consciousness, culture is conceived to hover over the material world but not to permeate it. In this view, in short, culture and materials do not mix; rather, culture wraps itself around the universe

of material things, shaping and transforming their outward surfaces without ever penetrating their interiority. Thus the particular surface of every artefact participates in the impenetrable surface of materiality itself as it is enveloped by the cultural imagination.

SURFACE, FORCE AND THE GENERATION OF FORM

Let us consider the most ordinary of everyday objects, one that crops up in a surprising range and variety of cultural settings around the world: a coiled basket. Has the basket been created through working on the surface of some raw material? Have the forces impacting on this surface been applied from without? Did they serve to impress onto the material a pre-existent, conceptual design? In every case, as I show below, the answer is 'Not exactly'. Thus the basket is not 'made' in the sense in which we normally understand the term. Nor, evidently, has it grown of its own accord. Thus neither of the available alternatives seem to work for the basket. It does not fit our stereotype of the artefact, and it is not a life-form. Let us start instead from the simple observation that constructing a basket is a process of weaving. In what follows, I shall consider what weaving entails, respectively, with regard to the topology of *surface*, the application of *force* and the generation of *form*.

We have seen that making, in what for convenience I shall henceforth call the 'standard view', implies the prior presence of a surface to be transformed. Thus the flint knapper chips away at the surface of stone, the carpenter carves and chisels the surface of wood, the blacksmith hammers on the surface of molten metal, and the potter applies manual pressure to the surface of clay. But once it has been cut and prepared for weaving, the basket-maker does nothing to the surface of her fibrous material. In the process of weaving, the surface of the basket is not so much transformed as built up. Moreover, there is no simple or straightforward correspondence between the surface of the basket and the surfaces of its constituent fibres. For example, the two outer surfaces of the transverse wrapping fibres that stitch successive loops of the coil are alternately 'outside' and 'inside' so far as the surface of the basket is concerned (see Figure 18.1). Indeed it is in the nature of weaving, as a technique, that it produces a peculiar kind of surface that does not, strictly speaking, have an inside and an outside at all.

In the special case of coiled basketry, there is a limited parallel with the technique of coil-building in pottery. Here the clay is first
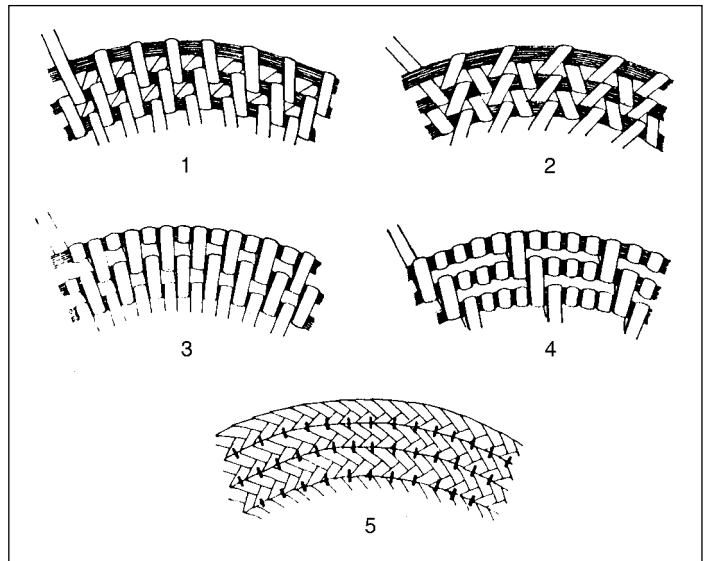
Figure 18.1 Patterns of wrapping in coiled basketry: (1) plain; (2) figure-of-eight ('Navajo'); (3) long and short ('lazy squaw'); (4) Peruvian coil; (5) sewn coil.

From H. Hodges, *Artifacts: an introduction to early materials and technology*, published by Duckworth, 1964, p. 131.

rolled out into long, thin, worm-like strips, rather analogous to the lengths of bundled fibres making up the basketry coil. These strips are then wound around and around to form the base and sides of the vessel. In this case too, a surface is built up. In the process, however, the original surfaces of the coiled strips congeal into a single mass, and the final smoothing leaves no trace of the original mode of construction. But there is another difference, equally critical, which brings me to the issue of force. The potter may have to contend with the force of gravity (his material, being both heavy and pliable, is inclined to sag). But the clay does not exert any independent force. This is not the case with basketry, however, which involves the bending and interweaving of fibres that may exert a considerable resistance of their own. Indeed the basket holds together, and assumes a rigid form, precisely because of its tensile structure.[1] In short, the form of the basket is the result of a play of forces, both internal and external to the material that makes it up. One could say that the form unfolds within a kind of force field, in which the weaver is caught up in a reciprocal and quite muscular dialogue with the material.

This point leads me to the final question concerning the generation of form. According to the standard view, the form pre-exists in the maker's mind, and is simply impressed upon the material. Now I do not deny that the basket-maker may begin work with a pretty clear idea of the form she wishes to create. The actual, concrete form of the basket, however, does not issue from the idea. It rather comes into being through the gradual unfolding of that field of forces set up through the active and sensuous engagement of practitioner and material. This field is neither internal to the material nor internal to the practitioner (hence external to the material); rather, it cuts across the emergent interface between them. Effectively, the form of the basket emerges through a pattern of *skilled movement*, and it is the rhythmic repetition of that movement that gives rise to the regularity of form. This point was made long ago by Franz Boas, in his classic work on *Primitive Art*.

> The basketmaker who manufactures a coiled basket, handles the fibres composing the coil in such a way that the greatest evenness of coil diameter results . . . In making her stitches the automatic control of the left hand that lays down the coil, and of the right that pulls the binding stitches over the coil brings it about that the distances between the stitches and the strength of the pull are absolutely even so that the surface will be smooth and evenly rounded and that the stitches show a perfectly regular pattern.
>
> (Boas 1955 [1927]: 20)

SPIRALS IN NATURE AND ART

Boas illustrates the point with a drawing, which I reproduce here (Figure 18.2A). Opposite, I have placed another drawing, this time taken from the work of the great biologist D'Arcy Wentworth Thompson, *On Growth and Form* (Figure 18.2B). It depicts the shell of a certain kind of gastropod. Although both the coiled basket and the shell have a characteristic spiral form, they are spirals of different kinds: the first is an equable spiral, the second logarithmic (that is, the radius of each successive whorl increases arithmetically in the one instance, and geometrically in the other). The equable spiral, as Thompson explains, is characteristic of artificial forms that have been produced by mechanically bending, coiling or rolling up a given length of material, whereas the logarithmic spiral is commonly produced in nature as a result of growth by deposition, where the material is cumulatively laid down at one end whilst maintaining an overall constancy of proportion

(Thompson 1961 [1917]: 178–9). Either way, however, the form appears to emerge with a certain logical inevitability from the process itself, of rolling up in the former case and laying down in the latter.

Now it is very often assumed, in the study of both organisms and artefacts, that to ask about the form of things is, in itself, to pose a question about *design*, as though the design contained a complete specification that has only to be 'written out' in the material. This assumption is central to the standard view which, as we have already seen, distinguishes between living and artificial things on the criterion of the interiority or exteriority of the design specification governing their production without questioning the premise that the resultant forms are indeed specified independently and in advance of the processes of growth or manufacture wherein they are realised. Thus it is supposed that the basic architecture of the organism is already established, as a genetic 'blueprint', from the very moment of conception; likewise the artefact is supposed to pre-exist, fully represented as a 'virtual object' in the mind, even before a finger has been lifted in its construction. In both cases the actualisation of the form is reduced to a simple matter of mechanical transcription: all the *creative* work has already been done in advance, whether by natural selection or human reason.[2]

Figure 18.2 Artefactual and natural spirals: (A) Coiled basketry.

From F. Boas, *Primitive art*, published by Dover Publications, 1955 [1927], p. 20.

(B) Gastropod shell. The angle α is known as the 'spiral angle', which in this case is large.

From D. W. Thompson, *On growth and form*, published by Cambridge University Press, 1961 [1917], p. 192.

How then, starting from this premise, might we set about accounting for the formation of spirals in nature and in art, in the shell of the gastropod and the coil of the basket? The account would likely run along the following lines: the form of the shell is internally specified in the gastropod's genetic inheritance, and revealed in its growth; the form of the basket is externally specified in the mind of the weaver, as part of a received cultural heritage, and revealed in its manufacture. Now natural selection, according to Darwinian orthodoxy, designs organisms to be adapted to their particular conditions of life, and as many scholars have suggested, a somewhat analogous process of blind variation and selective retention, operating in the arena of cultural ideas, could do likewise in designing artefacts that are well suited to their purpose. The fact that we come across spirals in the growth of living things (as in gastropods) as well as in the making of artefacts (as in basketry) may be purely fortuitous, or it may be the outcome of some kind of adaptive convergence – of natural selection and the human intellect, operating quite independently, arriving at parallel solutions to what might be, in essence, a rather similar problem of engineering design. If, to be more precise, the solution calls for a spiral of the equable type, or alternatively of the logarithmic type, then this is what we will find in the resultant forms, regardless of whether the design itself is encoded genetically or culturally. Hence by this account, the distinction between equable and logarithmic spirals would not, in itself, be relevant as an index of the organic or artefactual status of the objects concerned.

THE LIMITS OF DESIGN

According to the standard view, as outlined above, form is fully explicable in terms of the design that gives rise to it. Once you have accounted for the genesis of the design you have, to all intents and purposes, explained the form. Or have you? Would it be possible, even in theory, for any design to specify the form of an organism or artefact *completely*? In his fascinating study of the design principles embodied in the construction of living organisms and manufactured artefacts, originally written as a textbook for students of engineering, Michael French (1988: 266–7) speculates on the question of just how much information would be needed to specify every aspect of the form of an organism. His conclusion is that the amount would be unimaginably large, far beyond what could be coded in the DNA of any known life-form. Nor is the situation any different with artefacts. True, even the greatest achievements of human engineering are no match for the most commonplace of organisms: thus the steam locomotive, as French wryly observes, 'is simplicity itself compared with the intricacies of the buttercup' (1988: 1). But then, no human design could approach the DNA of the genome in its informational content. Once again, a complete specification would apparently lie beyond the realms of possibility. In short, the forms of both organisms and artefacts seem to be significantly underdetermined by their underlying blueprints. That being the case, French suggests, we may have to recognise that a great many features of organisms and artefacts are merely accidental, due to chance, revealing not the designs themselves but their limitations.

Though intended to shore up the argument from design against the objection that no specification can be exhaustive, this appeal to chance is a *reductio ad absurdum* that does more to highlight the poverty of the argument itself. To show why, let me turn to another example of spiral formation: the vortex of bathwater as it runs out of the plug-hole. Is the form of the vortex a matter of chance? It is certainly not dictated by the specifications of any design. You can determine whether the spiral runs clockwise or anticlockwise by setting up a current through the water with your hand; beyond that, however, the spiral appears to form of its own accord. But its formation is anything but an accident. It can, in fact, be explained in terms of well-established principles of fluid dynamics.

The example of the vortex is not my own; it is taken from the work of the biologist Brian Goodwin (1982), who uses it to say something very important about the generation of spiral forms in living organisms. In a certain species of snail, the majority of individuals have shells with a right-handed, logarithmic spiral, but in some the spiral is left-handed. It has been shown that the direction of the spiral is controlled by the products of a particular gene, just as the direction of the spiral vortex in bathwater is controlled by the intentional movement of your hand. But – and this is the crucial point – the *form* of the shell is no more the product of a genetic programme than is the form of the vortex the product of a design in your mind. There is, in short, no design for the spiral of the gastropod shell. Rather, the form arises through a process of growth within what is known technically as the 'morphogenetic field' – that is, the total system of relations set up by virtue of the presence of the developing organism in its environment. And the role of genes in the morphogenetic process is not to specify the form, even incompletely, but to set the parameters – such as handedness and spiral angle (see Figure 18.2B) – within which it unfolds (Goodwin 1982: 111).

ON THE GROWTH OF ARTEFACTS

Returning from the growth of organisms to the manufacture of artefacts, a parallel argument applies. Just as organic form is generated in the unfolding of the morphogenetic field, so the form of the artefact evolves within what I have called a field of forces. Both kinds of field cut across the developing interface between the object (organism or artefact) and an environment which, in the case of the artefact, critically includes its 'maker'. Where the organism engages its environment in the process of ontogenetic development, the artefact engages its maker in a pattern of skilled activity. These are truly creative engagements, in the sense that they actually *give rise* to the real-world artefactual and organic forms that we encounter, rather than serving – as the standard view would claim – to transcribe pre-existent form onto raw material. Moreover as a moment's reflection on the example of the vortex in bathwater will show, the properties of materials are directly implicated in the form-generating process. It is therefore no longer possible to sustain the distinction between form and substance that, as we have seen, is so central to the standard view of making things. Finally, the templates, measures and rules of thumb of the artisan or craftsman no more add up to a design for the artefacts he produces than do genes constitute a blueprint for the organism. Like genes, they set the parameters of the process but do not prefigure the form.[3]

All these points apply to the making of a coiled basket. Thus the equable form of the spiral base of the basket does not follow the dictates of any design; it is not imposed upon the material but arises through the work itself. Indeed the developing form acts as its own template, since each turn of the spiral is made by laying the longitudinal fibres along the edge formed by the preceding one. Now D'Arcy Thompson was of course right to point out that there is a difference between *bending* material into shape, as in basketry, and an organism's *growing* into it, as with the shell of the gastropod, and that this can lead to forms with contrasting mathematical properties. Nevertheless, if the unfolding of the morphogenetic field is described as a process of growth, would it not be fair to suggest that there is a sense in which artefacts, whose forms likewise evolve within a field of forces, 'grow' too – albeit according to different principles?

We could describe that growth as a process of *autopoiesis*, that is, the self-transformation over time of the system of relations within which an organism or artefact comes into being. Since the artisan is involved in the same system as the material with which he works, so his activity does not transform that system but is – like the growth of plants and animals – part and parcel of the system's transformation of itself. Through this autopoietic process, the temporal rhythms of life are gradually built into the structural properties of things – or as Boas put it, with regard to artefacts:

> The rhythm of time appears here translated into space. In the flaking, adzing, hammering, in the regular turning and pressing required in the making of coiled pottery, in weaving, regularity of form and rhythmic repetition of the same movement are necessarily connected.
>
> (Boas 1955 [1927]: 40)

The artefact, in short, is the crystallisation of activity within a relational field, its regularities of form embodying the regularities of movement that gave rise to it.

I would like to conclude this comparison of the coiled basket and the gastropod shell by commenting on the reasons for the remarkable durability of their respective forms.

According to the standard view, since form emanates from design, the persistence of form can only be explained in terms of the stability of the underlying design specifications. In the case of the organism these specifications are genetic, in the case of the artefact they are cultural. The constancy of form is thus a function of the fidelity with which genetic or cultural information is copied from one generation to the next, combined with the effects of natural selection – or its analogue in the realm of cultural ideas – in weeding out less well-adapted variants.

The argument I have proposed here, however, is just the opposite. If forms are the outcomes of dynamic, morphogenetic processes, then their stability can be understood in terms of the generative principles embedded in the material conditions of their production. For the shell the principle is one of invariant proportion; for the basket it is the principle that every increment of longitudinal extension is coupled to what has gone before by transverse attachment. Whereas the first principle, through simple iteration, will always and everywhere generate a logarithmic spiral, the second will just as reliably generate an equable one. It is these generative principles, and not the fidelity of genetic or cultural copying, that underwrite the constancy of the respective forms, and explain their persistence over immense spans of both historical and evolutionary time.

MAKING AS A WAY OF WEAVING

I now return to my earlier suggestion, that we reverse our normal order of priorities and regard making as a modality of weaving, rather than the other way around. One intriguing observation points us in this direction. Our word 'loom' comes from Middle English *lome*, which originally referred to a tool or utensil of any kind. Does this not suggest that to our predecessors, at least, the surface-building activity of weaving, rather than any of those activities involving the application of force to pre-existing surfaces, somehow epitomised technical processes in general?

The notion of making, of course, defines an activity purely in terms of its capacity to yield a certain object, whereas weaving focuses on the character of the process by which that object comes into existence. To emphasise making is to regard the object as the expression of an idea; to emphasise weaving is to regard it as the embodiment of a rhythmic movement. Therefore to invert making and weaving is also to invert idea and movement, to see the movement as truly generative of the object rather than merely revelatory of an object that is already present, in an ideal, conceptual or virtual form, in advance of the process that discloses it. The more that objects are removed from the contexts of life-activity in which they are produced and used – the more they appear as static objects of disinterested contemplation (as in museums and galleries) – the more, too, the process disappears or is hidden behind the product, the finished object. Thus we are inclined to look for the meaning of the object in the idea it expresses rather than in the current of activity to which it properly and originally belongs. It is precisely this contemplative attitude that leads to the redesignation of the ordinary objects of the quotidian environment as items of 'material culture' whose significance lies not so much in their incorporation into a habitual pattern of use as in their symbolic function. In suggesting that the relation between making and weaving be overturned, my purpose is to bring these products of human activity back to life, to restore them to the processes in which they, along with their users, are absorbed.[4]

In what way, then, does weaving epitomise human technical activity? What sense does it make to say that the blacksmith in his forge, or the carpenter at his bench, in trans-

forming the surfaces of metal and wood respectively, is actually weaving? Of course, to adopt this idiom is to interpret the notion of weaving more broadly than is customary. It does however help to draw attention to three points about skill which are exemplified in basketry but which are nevertheless common to the practice of any craft. First, the practitioner operates within a field of forces set up through his or her engagement with the material; secondly, the work does not merely involve the mechanical application of external force but calls for care, judgement and dexterity; and thirdly, the action has a narrative quality, in the sense that every movement, like every line in a story, grows rhythmically out of the one before and lays the groundwork for the next. In the following chapter, I shall explore these dimensions of skill at greater length.

This broad interpretation of weaving, though it may sound strange to modern, Western ears, is fully in accord with the understandings of the Yekuana, a native people of southern Venezuela. In his study of Yekuana baskets and basketry, David Guss observes that the master craftsman in this society, a person accredited with exceptional wisdom, 'not only weaves the world when making a basket, but *in everything he does*' (1989: 170, my emphasis). Yet this creative process of world-weaving, Guss shows, is not limited to the experts. It rather engages all Yekuana people throughout their lives – albeit at a lower level of perfection – in their manufacture of the essential equipment of traditional livelihood. In every case, from building houses and canoes to fabricating manioc graters and baskets, making is regarded as a way of weaving.

Paradoxically, however, in translating the indigenous term by which such locally produced items are distinguished from imported, commercially manufactured 'stuff' (such as tin cans and plastic buckets), Guss renders them as things not woven but *made*. Moreover the essence of making, in his view, lies in loading the object with metaphorical significance or semiotic content, such that artefacts become a mirror in which people can see reflected the fundamentals of their own culture. The symbolic capacity of artefacts, Guss insists, 'far outweighs their functional value' (1989: 70). Weaving the world, then, turns out to be a matter of 'making culture', of submitting the disorder of nature to the guidelines of traditional design.

Now the epistemology by which Guss converts the manifold products of world-weaving back into 'things made', instances of the cultural transformation of nature (1989: 161), is one that I reject. It is, as I have shown, an epistemology that takes as given the separation of the cultural imagination from the material world, and thus presupposes the existence, at their interface, of a surface to be transformed. According to what I have called the standard view, the human mind is supposed to inscribe its designs upon this surface through the mechanical application of bodily force – augmented, as appropriate, by technology. I mean to suggest, to the contrary, that the forms of objects are not imposed from above but grow from the mutual involvement of people and materials in an environment. The surface of nature is thus an illusion: the blacksmith, carpenter or potter – just as much as the basket-maker – works from within the world, not upon it. There are surfaces of course, but these divide states of matter, not matter from mind (see Chapter Thirteen, pp. 240–1, for further discussion of this point). And they emerge within the form-generating process, rather than pre-existing as a condition for it.

The philosopher Martin Heidegger expressed the very same point through an exploration of the notions of building and dwelling (see Chapter Ten, pp. 185–6). Opposing the modernist convention that dwelling is an activity that goes on within, and is structured by, an environment that is already built, Heidegger argued that we cannot engage in any kind of building activity unless we already dwell within our surroundings. 'Only

if we are capable of dwelling', he declared, 'only then can we build' (1971: 160). Now dwelling is to building, in Heidegger's terms, as weaving is to making in mine. Where making (like building) comes to an end with the completion of a work in its final form, weaving (like dwelling) continues for as long as life goes on – punctuated but not terminated by the appearance of the pieces that it successively brings into being.[5] Dwelling in the world, in short, is tantamount to the ongoing, temporal interweaving of our lives with one another and with the manifold constituents of our environment.

The world of our experience is, indeed, continually and endlessly coming into being around us as we weave. If it has a surface, it is like the surface of the basket: it has no 'inside' or 'outside'. Mind is not above, nor nature below; rather, if we ask where mind is, it is in the weave of the surface itself. And it is within this weave that our projects of making, whatever they may be, are formulated and come to fruition. Only if we are capable of weaving, only then can we make.

Of string bags and birds' nests
Skill and the construction of artefacts

BEYOND ART AND TECHNOLOGY

'Art' and 'technology' are mere words. And as with all words, their meanings are not fixed but have changed significantly in the course of their history. They are still changing. But I believe it remains true of modern – if not post-modern – thought, that the meanings of art and technology are held to be somehow opposed, as though drawn from fields of human endeavour that are in certain respects antithetical. This opposition, however, is scarcely more than a century old, and would have seemed strange to Anglophone ears as late as the seventeenth century, when artists were still considered no different from artisans, when the methods of working in any particular branch of art could be described as 'technical', and when the term 'technology' had just been coined to denote the scientific study of these methods (Williams 1976: 33–4). Etymologically, 'art' is derived from the Latin *artem* or *ars*, while 'technology' was formed upon the stem of the classical Greek *tekhnē*. Originally, *tekhnē* and *ars* meant much the same thing, namely *skill* of the kind associated with craftsmanship (see Chapter Fifteen). The words were used, respectively in Greek and Roman society, to describe every kind of activity involving the manufacture of durable objects by people who depended on such work for a living, from the painter to the cobbler, from the temple architect to the builder of pigsties. This is not to say that customers failed to distinguish between aesthetic and utilitarian criteria in their estimations of the objects produced. But in every case, it was the craft skill of the practitioner that was supposed to ensure a successful outcome (Burford 1972: 13–14).

The connotation of skill is preserved in many words derived from the same roots and that remain in common currency today. On the one hand we have 'technics' and 'technique'; on the other hand such terms as 'artless' – meaning clumsy or lacking in skill – and, of course, 'artefact'. Yet the apparent continuity masks an important shift, towards abstracting the components of intelligence, sensibility and expression that are essential to the accomplishment of any craft from the actual bodily movement of the practitioner in his or her environment. Thus the technique of the pianist comes to refer to the practised ability of his fingers to find their way around the keyboard and to hit the desired notes, as distinct from the inherent musicality of the performance. 'A player may be perfect in technique', wrote Sir Charles Grove, 'and yet have neither soul nor intelligence'. Likewise, we have come a long way from the days when, as in the year 1610, it was possible to eulogise a certain composer as 'the most artificial and famous Alfonso Ferrabosco' (Rooley 1990: 5). As David Lowenthal has observed, 'time has reversed the meaning of artificial from "full of deep skill and art" to "shallow, contrived and almost worthless"' (1996: 209). By the same token, the artefact is regarded no longer as the original outcome of a

skilled, sensuous engagement between the craftsman and his raw material, but as a copy run off mechanically from a pre-established template or design. This debasement of craft to the 'merely technical' or mechanical execution of predetermined operational sequences went hand in hand with the elevation of art to embrace the creative exercise of the imagination (Gell 1992b: 56). As a result, the artist came to be radically distinguished from the artisan, and the art-work from the artefact (Coleman 1988: 7).

The decisive break, according to Raymond Williams, came in the England of the late eighteenth century, with the exclusion of engravers from the newly formed Royal Academy, which was reserved for practitioners of the 'fine' arts of painting, drawing, and sculpture (Williams 1976: 33). It was, of course, symptomatic of a general tendency to distinguish intellectual from manual labour, along the common axis of a more fundamental series of oppositions between mind and body, creativity and repetition, and freedom and determination. But the more that 'art' came to be associated with the allegedly higher human faculties of creativity and imagination, the more its residual connotations of useful but nevertheless habitual bodily skills were swallowed up by the notion of technology. For by the beginning of the twentieth century this term, too, had undergone a crucial shift of meaning. Where once it had referred to the framework of concepts and theory informing the scientific study of productive practices, technology came to be regarded as a corpus of rules and principles installed at the heart of the apparatus of production itself, whence it was understood to generate practice as a programme generates an output. Technology, now, did not discipline the scholar in his study of techniques, but rather the practitioner in his application of them. He became, in effect, an operative, bound to the mechanical implementation of an objective and impersonal system of productive forces.[1]

Here, then, lies the source of the now familiar division between the respective fields of art and technology. An object or performance could be a work of art, rather than a mere artefact, to the extent that it escapes or transcends the determinations of the technological system. And its creator could be an artist, rather than a mere artisan, insofar as the work is understood to be an expression of his or her own subjective being. Where technological operations are predetermined, art is spontaneous; where the manufacture of artefacts is a process of mechanical replication, art is the creative production of novelty. These distinctions can be multiplied almost indefinitely, but they are all driven by the same logic, which is one that carves out a space for human freedom and subjectivity in a world governed by objective necessity. As I have shown in Chapter Seventeen (pp. 329–30), it is a logic that operates as much in the field of exchange as in that of production. Thus the modern distinction between the true work of art and the replicated artefact has its parallel in that between the 'pure gift' and the market commodity: the former given spontaneously and motivated (at least in theory) by personal feeling; the latter exchanged in line with impersonal calculations of supply and demand. But in both fields the distinctions are recent, and closely tied to the rise of a peculiarly modern conception of the human subject.

The division between art and technology, as it has come to be institutionalised in modern society, has affected anthropology as much as any other field of inquiry. Until fairly recently, the literatures in the anthropology of art and in the anthropology of technology remained almost completely isolated from one another. Technology was located within the sphere of ecological adaptation, mediating the material relations between human populations and their environments. For assorted cultural ecologists, cultural materialists, and Marxists, the conjunction of environment and technology – if not actually determinant of cultural form – constitutes the foundation upon which the house of culture is

built. Art, by contrast, along with such forms as myth and ritual, is supposed to comprise the patterns on the walls, the world of sensory experience as it is refracted through the filters and lenses of the cultural imagination. It mediates a dialogue, not between human beings and nature, but among persons in society. Like language, it encodes meanings. Thus technology works; art signifies: technical action is aimed to produce results in a mechanically determined way, whereas the purpose of art is to communicate ideas. In short, art has been split from technology along the lines of an opposition between the mental and the material, and between semiotics and mechanics (see Chapter Sixteen, pp. 317–18).

Despite the apparent symmetry of this opposition, the respective trajectories of the anthropologies of art and technology have been decidedly asymmetrical. Having been placed beyond the pale of culture and society, as a quasi-autonomous system of productive forces, technology was largely neglected as a subject of anthropological inquiry. Only very recently has the anthropology of technology, as a subfield, begun to acquire a significant momentum of its own. The anthropology of art, by contrast, has long held a secure place in the discipline. But the very reasons that have led to the inclusion of art as an object of study for anthropologists – namely, that it is clearly positioned within a social context and embodies cultural meaning – have also given rise to persistent doubts about the cross-cultural validity of the concept of art itself. How can a concept that carries such strong evaluative overtones, and whose meaning is so closely bound up with widely held ideas about the ascendancy of Western civilisation, possibly be applied without courting accusations of ethnocentrism? Not for the first time, the very credentials that make a phenomenon eminently worthy of anthropological study have cast a pall of uncertainty over whether the phenomenon exists 'as such' at all. It happened with the study of kinship, it happened with the study of art, and now that anthropologists are at last beginning to recognise the social embeddedness of technological systems, it is happening to the study of technology too. No sooner is technology reclaimed for anthropological inquiry, than we cease to know, for sure, what we are dealing with.

The source of the problem, in my view, lies not in the concept of art, nor in that of technology, but in the dichotomy between them. It is this, along with the idea that art floats in an ethereal realm of symbolic meaning, above the physical world over which technology seeks control, that is tainted by its association with modernity. The idea would have made no sense to the craftsmen of Ancient Greece or Rome. They knew what they meant by *tekhnē* or *ars*, and it was a matter neither of mechanical functioning nor of symbolic expression, but of skilled practice. It is my contention that by going back to the original connotations of *ars* and *tekhnē* as skill, we can overcome the deep divisions that currently separate the anthropologies of art and technology, and develop a far more satisfactory account of the socially and environmentally situated practices of real human agents. In what follows I shall pursue three aspects of this task. First, I explain in more depth what I mean by skill. Secondly, I show how the continuity of tradition in skilled practice is a function not of the transmission of rules and representations but of the coordination of perception and action. Thirdly, I show how a focus on skill explodes the conventional dichotomy between innate and acquired abilities, forcing a radical reappraisal of the ways we think about what is 'cultural' and 'biological' in humans. I shall illustrate my argument by way of two examples: Maureen MacKenzie's (1991) study of the looping skills involved in making string bags (*bilum*) among Telefol people of Central New Guinea, and the study by N. E. and E. C. Collias (1984) of the nest building skills of the male weaverbird.

FIVE DIMENSIONS OF SKILL

I begin by drawing attention to five points which I believe are crucial to a proper appreciation of technical skills. The first concerns what it means to say that practice is a form of *use*, of tools and of the body. In one of his dialogues, Plato has Socrates debate with a character called Alcibiades on precisely this question. 'What are we to say of the shoemaker?', asks Socrates, 'Does he cut with his tools only, or with his hands as well?' Alcibiades is forced to concede that he does indeed cut with his hands, and moreover that he uses not just his hands but his eyes – and by extension his whole body – to accomplish the work. Yet he had already agreed, with Socrates, that there is a fundamental difference between the user and the things he uses. So who is this user? If it be man, counters Socrates, it cannot be his body, which is used. Only one possibility remains, it must be the soul. 'So', he concludes, 'do you require some yet clearer proof that the soul is man?' Alcibiades is convinced (in Flew 1964: 35–7).

There is no reason, however, why we should have to follow suit. 'It would be wrong to assume', as Roger Coleman caustically remarks, 'that because Plato was a Greek he knew what he was talking about'. He was no craftsman, and had no practical experience whatever of shoemaking or any other trade. Plato's objective, in forcing a division between the controlling mind and subservient body, was to establish the supremacy of abstract, contemplative reason over menial work, or of theoretical knowledge over practical application, and thereby to justify the institution of slavery (Coleman 1988: 11–12). Resurrected in the Renaissance, Plato's division anticipated the debasement of craft that, as we have seen, came to be one of the hallmarks of modernity. To recover the essence of skill we need a different concept of use from the one invoked by Plato. Instead of thinking of use as what happens when we put two, initially separate things together – an agent with certain purposes or designs, and an instrument with certain functions – we can take it as the primary condition of involvement of the craftsman, with his tools and raw materials, in an environment. In this sense the hands and eyes of the shoemaker, as well as his cutting tools, are not so much used as *brought into use*, through their incorporation into an accustomed (that is usual) pattern of dextrous activity. Intentionality and functionality, then, are not pre-existing properties of the user and the used, but rather immanent in the activity itself, in the gestural synergy of human being, tool and raw material.

My second point follows from this. It is that skill cannot be regarded simply as a technique of the body. This was the position advocated in a now classic essay by Marcel Mauss (1979[1934]). Taking his cue explicitly from Plato, Mauss observed that technique does not, in itself, depend upon the use of tools. Song and dance are obvious examples. The dancer, according to Mauss, uses his own body as an instrument; indeed so do we all, he declares, for the body is surely 'man's first and most natural technical object, and at the same time technical means'. Moreover in the deployment of these means, the human agent experiences the resulting bodily movements as 'of a mechanical, physical or physico-chemical order' (p. 104). This reduction of the technical to the mechanical is an inevitable consequence of the isolation of the body as a natural or physical object, both from the (disembodied) agency that puts it to work and from the environment in which it operates. To understand the true nature of skill we must move in the opposite direction, that is, to restore the human organism to the original context of its active engagement with the constituents of its surroundings. As Gregory Bateson argued, by way of his example of the skilled woodsman notching with an axe the trunk of a tree he is felling, to explain what is going on we need to consider the dynamics of the entire man–axe–tree system

(1973: 433). The system is, indeed, as much mental as physical or physiological, for these are, in truth, but alternative descriptions of one and the same thing. Skill, in short, is a property not of the individual human body as a biophysical entity, a thing-in-itself, but of the total field of relations constituted by the presence of the organism-person, indissolubly body and mind, in a richly structured environment. That is why the study of skill, in my view, not only benefits from, but *demands* an ecological approach.

Granted that the foundations of skill lie in the irreducible condition of the practitioner's embeddedness in an environment, it follows – and this is my third point – that skilled practice is not just the application of mechanical force to exterior objects, but entails qualities of care, judgment and dexterity (Pye 1968: 22). Critically, this implies that whatever practitioners do *to* things is grounded in an attentive, perceptual involvement *with* them, or in other words, that they watch and feel as they work. As the Russian neuroscientist Nicholai Bernstein argued some fifty years ago, the essence of dexterity lies not in bodily movements themselves, but in the responsiveness of these movements to surrounding conditions that are never the same from one moment to the next (Bernstein 1996). Given the freedom of movement of the limbs as well as the elasticity of the muscles, Bernstein had observed, it is just not possible to control the movements of the body in the same way as one might the workings of a machine made up of rigid, interconnecting parts. From a close study of the movements of a skilled blacksmith, hitting the iron on the anvil over and over again with a hammer, Bernstein found that while the trajectory of the tip of the hammer was highly reproducible, the trajectories of individual arm joints varied from stroke to stroke. At first glance the situation appears paradoxical: how can it be that the motion of the hammer rather than that of the limbs is reliably reproduced, when it is only by way of the limbs that the hammer is made to move (cf. Latash 1996: 286)? Clearly, the smith's movements cannot be understood as the output of a fixed motor programme, nor are they arrived at through the application of a formula. The secret of control, Bernstein concluded, lies in 'sensory corrections', that is in the continual adjustment or 'tuning' of movement in response to an ongoing perceptual monitoring of the emergent task.

All this has implications for the way skills are learned, which brings me to my fourth point. If, as Bernstein contended, skilled practice cannot be reduced to a formula, then it cannot be through the transmission of formulae that skills are passed from generation to generation. Traditional models of social learning separate the intergenerational transmission of information specifying particular techniques from the application of this information in practice. First, a generative schema or programme is established in the novice's mind from his observations of the movements of already accomplished practitioners; secondly, the novice imitates these movements by running off exemplars of the technique in question from the schema. Now I do not deny that the learning of skills involves both observation and imitation. But the former is no more a matter of forming internal, mental representations of observed behaviour than is the latter a matter of converting these representations into manifest practice. For the novice's observation of accomplished practitioners is not detached from, but grounded in, his own active, perceptual engagement with his surroundings. And the key to imitation lies in the intimate coordination of the movement of the novice's attention to others with his own bodily movement in the world. Through repeated practical trials, and guided by his observations, he gradually gets the 'feel' of things for himself – that is, he learns to fine-tune his own movements so as to achieve the rhythmic fluency of the accomplished practitioner (for an example, see Gatewood 1985). And in this process, each generation contributes to the

next not by handing on a corpus of representations, or information in the strict sense, but rather by introducing novices into contexts which afford selected opportunities for perception and action, and by providing the scaffolding that enables them to make use of these affordances. This is what James Gibson (1979: 254) called an 'education of attention'.

It is because practitioners' engagement with the material with which they work is an attentive engagement, rather than a mere mechanical coupling, that skilled activity carries its own intrinsic intentionality, quite apart from any designs or plans that it may be supposed to implement (see Chapter Twenty-three, p. 415). My fifth point follows from this, and has to do with what we mean by making things. Let me return for a moment to the example of Socrates and the shoemaker. Socrates had asked what it means to say of the shoemaker that he uses tools. The other side of the question is to ask what it means to say that he makes shoes. If use, as Socrates maintained, is what happens when you put an agent having a certain purpose together with objects having certain functions, then the purpose must precede the use through which it is realised. In these terms, to refer to an action as one of making is to refer back to the prior intention that motivates it. It is as though the form of the manufactured object were already prefigured, as a design, in the mind of its maker, such that the activity of making issued directly from the design and served only to transcribe it onto the material. The assumption that every form is the outward expression of design is, as we saw in the last chapter, as prevalent in biology as it is in technology. Thus the form of an organism is said to be given in an evolved design specification, the genotype, in advance of its phenotypic 'expression' in an environment. And in modern architecture the form of a construction is supposed exist in miniature, in models, drawings and plans, before any building work begins (Coleman 1988: 16). To take this view, however, is to deny the creativity of the very process of environmentally situated and perceptually engaged activity, that is of *use*, through which real forms emerge and are held in place. It is the activity itself – of regular, controlled movement – that generates the form, not the design that precedes it. Making, in short, arises within the process of use, rather than use disclosing what is, ideally if not materially, ready-made.

How to make a string bag

Among the Telefol people of central New Guinea, and indeed throughout this region, one of the most ubiquitous and multifunctional accessories to everyday life is the string bag or *bilum*. It is made by means of a looping technique from two-ply string spun from plant fibres. Children are introduced to the techniques of *bilum* making from a very early age. All young Telefol children, both boys and girls, help their mothers and elder sisters in preparing fibres for spinning. 'From the age of about two onwards they begin to experiment with roving, rolling the shredded fibres down their thigh to make a single ply, and progress to experiments with spinning. It is not uncommon to see very young girls, mere toddlers, diligently attempting to loop the string they have made into bilum fabric' (MacKenzie 1991: 101). Boys, as they grow older, do not go on to master fully the skills of looping, for the simple reason that they are soon removed, by the conventions of their society, from the sphere of women's activities. Men have no need to make their own bags, as these are willingly supplied for them by women, who thus maintain an effective monopoly on *bilum* making. Girls, by contrast, remain close to their mothers and other female relatives, and continue to develop their skills, quietly and unobtrusively following in their mothers' footsteps.

All the points I have made about skill, in the previous section, apply to the making of string bags. Apart from the maker's body – and especially her fingers – the only tools used are the mesh gauge (*ding*), made from a strip of leaf, to maintain the constancy of the mesh in an open weave (see Figure 19.1), and the needle (*siil*), made of bone, which is needed for making tightly looped baskets without the use of the gauge (MacKenzie 1991: 73). But in use the needle or the gauge, along with the fingers that hold it, are as much a part of the user as they are used. Moreover the accomplished *bilum*-maker does not experience the movements of her body as being of a mechanical nature. Far from answering to commands issued from a higher source, they carry their own intentionality, unfolding in a continual dialogue with the material. Telefol people liken this movement to the flowing water of a river. Thus the body-in-use is not moved, like a rigid object,
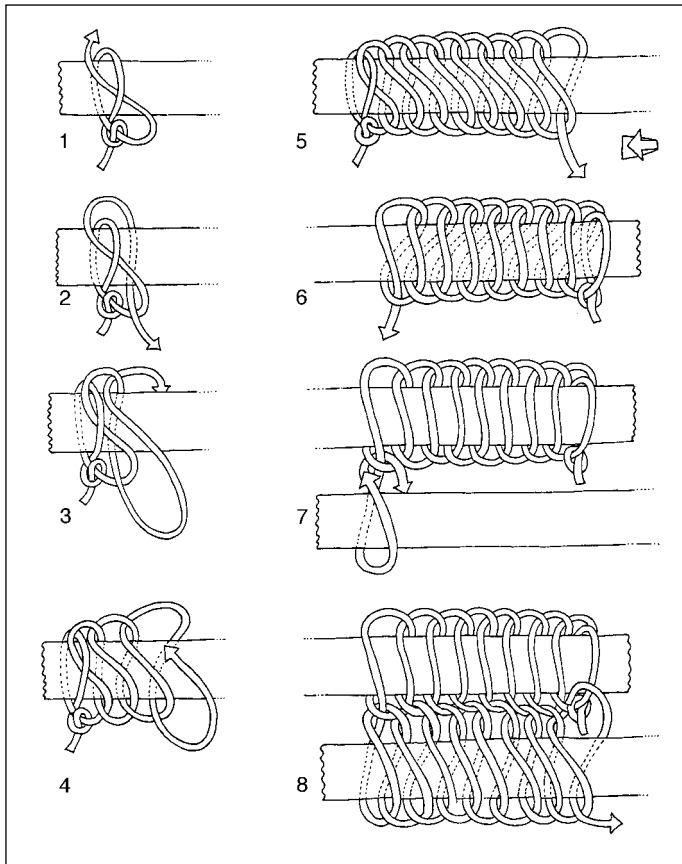
Figure 19.1 The step-by-step procedure for looping a flat strip of 'open, spaced' *bilum* fabric, as practised by Telefol people of central New Guinea. Steps 1–4 show how the first row of loops is constructed around the mesh gauge (*ding*), in a series of figure-of-eight loops with each loop connecting into the preceding one. By stage 5 the first row of loops is completed to the desired width. On completion of each row the work must be turned over so that the working thread is always on the left-hand side. In step 6 the work is thus reversed. Step 7 illustrates how a new strip of *ding* is inserted at the beginning of each successive row. This linear way of working, with each row connecting into the loops of the preceding one, is then repeated (step 8).

From MacKenzie, *Androgynous Objects: string bags and gender in central New Guinea*, published by Harwood Academic, 1991, pp. 86–7.

but rather becomes one with the flow (p. 102). However, in order to maintain the evenness of the string, in spinning, or of the weave, in looping, it is necessary to make continual adjustments in the course of the movement itself. 'By adolescence', MacKenzie writes, 'all girls have mastered the technique of spinning, gaining visual acuity in selecting equal assemblages of filaments during the roving process; and a sensitivity or balance in the amount of pressure applied between palm and thigh during the rhythmic plying motion' (p. 76). As this passage clearly reveals, dexterity in spinning depends on the fine-tuning of visual as well as haptic perception. And it is equally clear that the form of the *bilum* is an emergent outcome of rhythmically repeated, controlled movement in the processes of spinning and looping.

The issue on which I want to focus here, however, concerns how *bilum*-making skills are passed from generation to generation. MacKenzie herself describes this in terms of a fairly conventional model of social learning, according to which 'observation is followed by internalisation and then mimesis' (p. 100). Thus by watching the activity of her mother, a young girl absorbs and assimilates the 'intrinsic rules' of the craft. Once these are firmly implanted in her mind, she can proceed to execute them in the production of her own work. The fact that 'each daughter follows exactly the motor habits and bodily motions of her mother' leads to a remarkable cultural conformity from one generation to the next (p. 103). There is much in MacKenzie's own account, however, to suggest that conformity to tradition is *not* a consequence of the intergenerational transmission of rules or formulae, however intrinsic, but rather the result of a process of guided rediscovery in which the role of experienced *bilum*-makers is to set up the contexts within which novices are enabled to gain in proficiency for themselves, or in other words to 'grow into' the skills of spinning and looping.

First of all, it is clear that to advance in these skills it is not enough for the novice to know how their constituent movements look 'from the outside'; she has also to know how they feel 'from the inside' (cf. Bernstein 1996: 184–5). One young woman, recalling how she learned to loop as a child, told of how she had once tried to carry on with an unfinished *bilum* that her mother had left in the rafters of the house before leaving to work in the garden. She had been carefully watching the way her mother's hands moved as she looped the *bilum*. But on trying it out herself, the result was a disaster. When her mother returned, it took her hours to undo the mess. At first she was angry, but then she lectured her daughter with the following words of wisdom:

> You must practise to get the proper feel of looping. When you've made your first bilum it will be cranky but then we'll throw it in the river. The river will carry your wonky bilum away, and it will wash away your heavy handedness. Then your hands will be good at making bilums, your hands will move easily like running water.
>
> (from MacKenzie 1991: 102)

What does it mean to get the 'feel' of looping? It could mean that the observation on which learning depends is as much tactile as visual, or that the skill is embodied as a rhythmic pattern of movement rather than a static schema, or that the key to fluent performance lies in the ability to co-ordinate perception and action. All three are undoubtedly important, but none more so than the third. For it is this, as MacKenzie herself observes, that makes the difference between clumsiness and dexterity, between having heavy hands and hands that flow. 'Clumsiness, *iluum t'eb'e su* [to be heavy handed], is deemed natural at first, and must be practically worked through' (p. 103).

It seems, then, that progress from clumsiness to dexterity in the craft of *bilum*-making is brought about not by way of an internalisation of rules and representations, but through the gradual attunement of movement and perception. As in any craft, the skilled maker who has a feel for what she is doing is one whose movement is continually and subtly responsive to the modulations of her relation with the material. Conversely, the clumsy practitioner is precisely one who implements mechanically a fixed sequence of instructions, while remaining insensitive to the evolving conditions of the task as it unfolds. The hand that is heavy is experienced as a resistance to be overcome, and has to be moved from position to position in ways that seem contrary to its nature. The light hand, by contrast, finds its way of its own accord. The heavy-handed novice does not, of course, move in exactly the same way as her light-handed mother, nor can she be expected to produce such satisfactory results. This is precisely where the standard model of the social learning of technical skills goes wrong. For in attributing the intergenerational conformity of movements to rules that are transmitted and internalised *in advance* of their practical application in mimesis, the model assumes that practice is a matter of executing identical, rule-governed movements over and over again, leading to gains in speed, efficiency and automation. But a little girl, making her first *bilum*, is quite unable to produce these movements. Rather than repeatedly carrying out the same movements, generated from an already internalised schema, she is repeatedly set the same *task*, generated within the social context of mother–daughter relations. The ability to reproduce her mother's movements with precision, depending as it does on subtle sensory attunement, is not a natural foundation for enskilment but its consequence (cf. Reed and Bril 1996: 438).

Telefol women, according to MacKenzie, place great value on the standardisation of their looping techniques, since this is a way of confirming tribal identity (1991: 103). But I would contend that this standardisation is not brought about, as MacKenzie claims, by conformity to rules. Indeed there appear to be no rules, beyond general exhortations of the kind delivered by the mother to her daughter in the case described above, or vague 'rules of thumb' that help prepare the practitioner for her impending activity but in no way determine its course (Suchman 1987: 52). Like most commonplace practical skills, such as tying shoelaces in Western society, looping resists codification in the form of generative rules or algorithms (Dreyfus and Dreyfus 1987). One becomes aware of this simply by looking at the elaborate diagrams, accompanied by written commentary, by means of which MacKenzie attempts to explain the step-by-step procedure for open-spaced looping (pp. 83–99, and for an example, see Figure 19.1). Though these diagrams are admirable for their intended purpose, of ethnographic description, any attempt by the untutored reader to follow them in practice would likely lead to the same kind of tangle that the inexperienced Telefol girl produces, on secretly attempting to carry on with her mother's work. It would be quite mistaken to suppose that anything remotely equivalent exists in the native mind. But if standardisation does not follow from the application of rules, how are we to account for the persistence of technique from one generation to the next?

Partly in an attempt to answer this question, a group of us in the Department of Social Anthropology at the University of Manchester resolved to experiment with different ways of making knots. One of our experiments was to try making a completely unfamiliar and rather complicated knot, guided only by a manual which provided detailed verbal instructions and step by step diagrams. It turned out to be an immensely difficult and frustrating task. The problem we all experienced lay in converting each instruction, whether verbal or graphic, into actual bodily movement. For while the instruction was supposed to tell you how to move, one could only make sense of it once the movement had been

accomplished. We seemed, almost literally, to be caught in a double bind, from which the only escape was patient trial and error. Of course we had resort to the instructions, but far from directing our movements, what they provided was a set of landmarks along the way, a means of checking that we were still on track. If we were not – if the tangle of string in front of us did not match the corresponding graph (and that, in itself, was not easy to discern) – there was no alternative but to unravel the whole thing and start again!

Our experiments seemed to lend strong empirical support for the view that the practices of knotting – which are, after all, among the most common and widely distributed in human societies – cannot be understood as the output of any kind of programme. They cannot, then, be learned by taking any such programme 'on board', as part of an acquired tradition, as if all you needed to know to make knots could be handed down as a package of rules and representations, independently and in advance of their practical application. In our experiments, despite having a manual to consult, we had to develop the necessary know-how from scratch. Generally speaking, of course, this is not a problem that novices face in real life. They are shown what to do by more experienced hands, as we have already seen in the case of the acquisition of looping skills by Telefol *bilum*-makers. But in seeking to emulate the work of the tutor, the novice is guided by the latter's *movements*, not by formal instructions that have somehow been already copied into his or her head. As Merleau-Ponty put it, citing the pioneering work of Paul Guillaume on imitation in children, 'we do not at first imitate others but rather the actions of others, and . . . find others at the point of origin of these actions' (1964b: 117, see also Bourdieu 1977: 87). It follows that the reproduction of movement patterns is a function not of the fidelity with which information specifying these patterns is copied from one generation to the next, but of the co-ordination of perception and action that lies at the heart of practical mimesis.

DISSOLVING THE DISTINCTION BETWEEN INNATE AND ACQUIRED SKILLS

It is obvious that Telefol girls have to learn to make string bags. It is not a skill that they are, in any sense, 'born with'. As MacKenzie notes, 'talent in bilum making, that is, having hands which flow, is [defined as] a physically acquired attribute rather than an inherent pre-disposition in the sense that westerners think of ability and talent' (1991: 103). My concern now is to look more closely at what it means to say that a particular skill is acquired rather than innate. I shall do so by way of another example, this time taken from the animal kingdom. For while we are used to thinking of human skills as belonging to this or that cultural tradition, the skills of non-human animals are commonly regarded as properties of their genetically encoded, species-specific nature. What are we to make, then, of the male weaverbird, which carries out the most intricate knotting and looping with its beak in the construction of its nest? The nest building of weaverbirds has been investigated in a remarkable series of studies by ornithologists N. E. and E. C. Collias, and in what follows I draw on their report (Collias and Collias 1984).

The nest is made from long strips torn from the leaves of grasses, which are intertwined in a regular lattice formed by passing successive strips over and under, and in a direction orthogonal to, strips already laid. It is held together, and attached to the substrate, by a variety of stitches and fastenings, some of which are illustrated in Figure 19.2. The bird uses its beak rather like a needle in sewing or darning; in this the trickiest part lies in

threading the strip it is holding under another, transverse one so that it can then be passed over the next. The strip has to be pushed under, and through, just far enough to enable the bird to let go with its beak in order to shift its hold and pull it up on the other side. If the free end is left too short, the strip may spring back; pushed too far, it could fall to the ground. Mastering this operation calls for a good deal of practice. From an early age, weaverbirds spend much of their time manipulating all kinds of objects with their beaks, and seem to have a particular interest in poking and pulling pieces of grass leaves and similar materials through holes. In females this interest declines after about the tenth week from hatching, whereas in males it continues to increase. Experiments showed that birds deprived of opportunities to practise and denied access to suitable materials are subsequently unable to build adequate nests, or even to build at all. Indeed, fiddling about with potential nest material appears to be just as essential for the bird, in preparing itself for future building, as are the first experiments of Telefolmin toddlers in roving and spinning shredded fibres for their future *bilum* making (Collias and Collias 1984: 201, 206–7, 212, 215–20).

It is evident from the Collias' account that all the five qualities of skill which, as I have shown, are exemplified in the making of string bags by people of central New Guinea, are also manifest in the nest building of weaverbirds. Though the needle of the *bilum*-maker is detachable from the body whereas the bird's beak is not, in use both are not so much moved as incorporated into a habitual pattern of movement. The abilities of the weaverbird, just like those of the human maker of string bags, are developed through an active exploration of the possibilities afforded by the environment, in the choice of materials and structural supports, and of bodily capacities of movement, posture, and prehension. Furthermore, the key to successful nest building lies not so much in the movements themselves as in the bird's ability to adjust its movements with exquisite precision in relation to the evolving form of its construction. As Collias and Collias report:
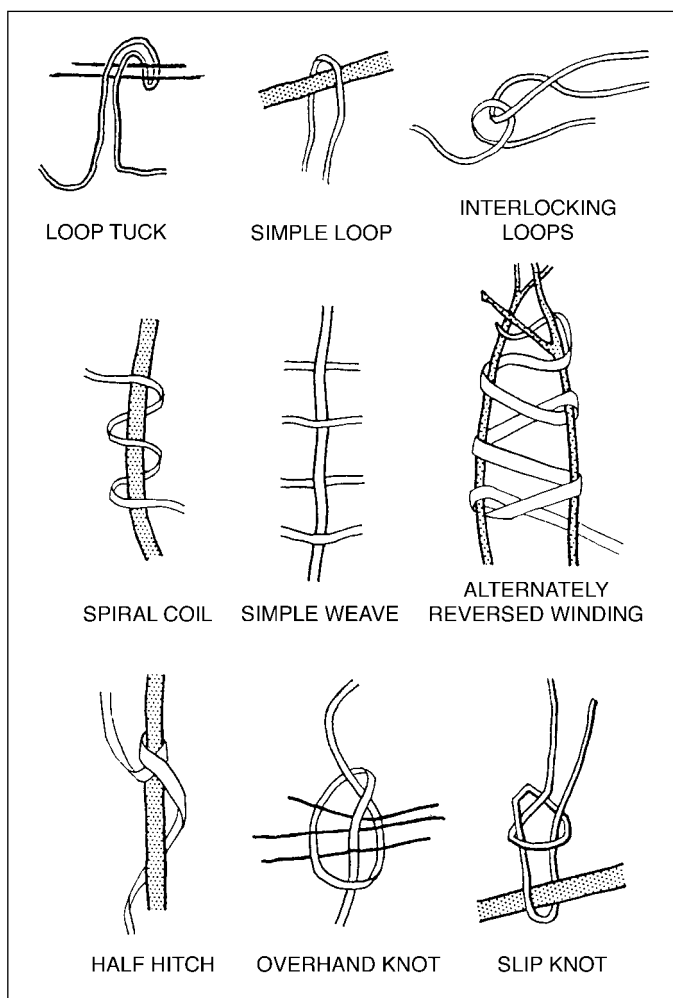
Figure 19.2 Various common stitches and fastenings used by male weaverbirds in constructing their nests.

From N. E. Collias and E. C. Collias, *Nest Building and Bird Behavior*, © 1984 by Princeton University Press, reprinted by permission of Princeton University Press.

> In watching the numerous attempts of young male weavers to fasten initial strips of nest materials and their gradual improvement in weaving ability, it seemed to us that what every young male weaver has to learn is what in subjective terminology one would call 'judgement'.
>
> (1984: 219)

One can sense the reluctance with which these hardnosed empirical observers find themselves having to resort to a notion of this kind. But the evidence leaves them with no alternative. It is clearly judgement, rather than a programme of instructions or a set of design specifications to be mechanically applied, that the bird acquires through mimetic practice. Finally, the form of the nest results from the iteration of a small number of basic movements, and from the fact that the bird stands throughout on the same spot while it weaves all around – above, below and in front – pushing out the developing shell of the main chamber as far as its beak will reach, and then tilting gradually backwards to complete the antechamber and entrance (1984: 193, 209–10).

Given that weaverbirds, in their nest building, exhibit the same properties of skill as are manifested in the looping techniques of the Telefolmin and their neighbours, wherein lies the difference? The conventional answer is to claim that the human *bilum*-maker follows the dictates of an acquired cultural tradition, while the bird works to a template that is genetically transmitted and thus innate. But if, as our experiments with knot-making suggested, there can be no programme for such tasks as knotting, looping, and weaving that is not immanent in the activity itself, then it makes no more sense to interpret the weaverbird's behaviour as the output of a genetic programme than it does to interpret the *bilum*-maker's as the output of a cultural one. In all likelihood the human maker of string bags has an idea in mind of the final form of the construction, whereas the weaverbird almost certainly does not. Yet in both cases it is the pattern of regular movement, not some prespecified design, that generates the form. And the fluency and dexterity of this movement is a function of skills that are developmentally incorporated into the *modus operandi* of the organism – whether avian or human – through practice and experience in an environment.

This last point is absolutely critical. Recall that Telefol girls develop their looping skills at a time of life when their bodies are also undergoing rapid growth. These skills, then, far from being added on to a preformed body, actually grow with it. In that regard they are fully part and parcel of the human organism, of its neurology, musculature, even anatomy, and so are as much biological as cultural. After all, a human being, with its particular aptitudes and dispositions, is a product of neither genes nor culture, nor of both together, but is rather formed within a lifelong process of ontogenetic development. To be sure, the skills of looping are acquired, in the sense that at whatever stage in the life-cycle they may be identified, a history of development already lies behind them. But the same would have to be said of the knotting and looping skills of the weaverbird, and indeed of *any* skill, human or non-human. Moreover one could just as well claim that such skills are innate, in the sense that so long as the necessary environmental conditions are in place (including the presence and activity of already skilled practitioners) they are more or less bound to develop. All Telefol girls learn to make string bags, just as they all learn to walk or to speak. All male weaverbirds learn to make nests, unless opportunities for practice are artificially removed. Conversely, Telefol boys and female weaverbirds never develop full-blown looping and weaving skills, since their respective activities and concerns take them too soon into other fields of practice. In short, whatever the difference between

the two sets of skills, avian and human, it cannot be aligned on the axis of a distinction between the innate and the acquired.

This conclusion, however, leaves us with our earlier question unanswered. How, exactly, *do* human skills, such as those exemplified in the making of string bags, differ from those of animals such as the weaverbird? To be frank, I do not pretend to know. I remain perplexed by the question, and have yet to find an answer that is wholly convincing. Once again, however, MacKenzie's study of the Telefol offers a possible clue. It lies in the observation, to which I have already alluded, that Telefol people liken the dextrous manual movements of the fluent *bilum*-maker to running water (MacKenzie 1991: 136). For these inhabitants of intermontane valleys, the current of water in a river or stream is as familiar a part of experience as is the motion of the hands in looping. Now it seems reasonable to suppose, likewise, that the weaverbird has as much of a 'feel' for air currents, while on the wing, as it has for nest materials in building with its beak. However what the bird does not do, so far as we know, is to tie these different strands of perception and action together. If birds were human, they would say that the good weaver is one whose beak seems to 'fly', just as Telefol say that the skilled looper is one whose hands 'flow'. But they do not do this. Human beings, it seems, differ from other animals in that they are peculiarly able to treat the manifold threads of experience as material for further acts of weaving and looping, thereby creating intricate patterns of metaphorical connection. This interweaving of experience is generally conducted in the idioms of speech, as in storytelling, and the patterns to which it gives rise are equivalent to what anthropologists are accustomed to calling 'culture'.

However, culture thus conceived cannot be understood to comprise a system of intrinsic rules or schemata by means of which the mind constructs representations of the external world from the data of bodily sensation, nor can speech be regarded simply as a vehicle for the articulation of these mental representations. Speakers no more 'use' their voice, as Plato would have had it, as the mere instrument of a language-based intelligence, than they 'make' sense by superimposing their pre-existing designs upon the raw material of experience. Rather, in speech, the voice is incorporated into a current of sensuous activity – namely, narrative performance – from which, as it unfolds, form and meaning are continually generated. For speaking is itself a form of skilled practice, and as such, exhibits all the generic properties of skill to which I have already drawn attention. Like any other skill, speech develops along with the growth of the organism, is continually responsive to perturbations in the perceived environment, and is learned through repeated practical trials in socially scaffolded contexts. Above all, it cannot be reduced to the mechanical execution of a rule-governed system, or 'grammar'. Yet speech is no ordinary skill. Weaving together, in narrative, the multiple strands of action and perception specific to diverse tasks and situations, it serves, if you will, as the *Skill of skills*. And if one were to ask where culture lies, the answer would not be in some shadowy domain of symbolic meaning, hovering aloof from the 'hands on' business of practical life, but in the very texture and pattern of the weave itself.

The dynamics of technical change

There is a wonderful footnote in Marx's *Capital* that sets a whole agenda for research. It runs as follows:

> Darwin has aroused our interest in the history of natural technology, that is to say in the origin of the organs of plants and animals as productive instruments utilised for the life purposes of these creatures. Does not the history of the origin of the productive organs of men in society, the organs which form the material basis of every kind of social organisation, deserve equal attention? Since, as Vico says, the essence of the distinction between human history and natural history is that the former is the work of man and the latter is not, would not the history of human technology be easier to write than the history of natural technology?[1]
>
> (1930: 392–3, fn. 2)

This passage suggests three crucial questions. First, what exactly is the difference between the 'history of natural technology' and the 'history of human technology'? In modern usage, we have grown accustomed to referring to the former as a process of evolution while reserving the concept of history for the latter. The question then becomes: how, if at all, can we distinguish between evolutionary and historical change in the field of technical phenomena? Secondly, Darwin was greatly perplexed by the issue of whether there is anything inherently progressive about the process he called 'descent with modification'. His considered conclusion was that progress, of a kind, *has* occurred, but that there is nothing in the theory of variation under natural selection that stipulates that it *must* occur. Is this also the case with technology? Finally, are the mechanisms of technical change comparable to, or quite different from, those that Darwin adduced for the adaptive modification of organic species? In other words, can we account for technical change in terms of a principle of variation under selection? In this chapter, I shall deal with each of these questions in turn.

THE EVOLUTION OF TECHNOLOGY AND ITS HISTORY

Comparing what students of animal behaviour on the one hand, and social and cultural anthropologists, on the other, have to say about technical change, one cannot help noting a curious discrepancy. Looking for the causes of such change, animal behaviourists typically attribute it to the evolution under natural selection of the animal species itself. Tools and tool-using behaviour are regarded as part of the phenotypic expression of an underlying genotype, and they change as the genotype changes – that is, as the species evolves.

Explaining the evolution of animal tool behaviour is thus no different, in principle, from explaining the evolution of those functional attachments – the finch's beak, the crab's pincers, the lion's claws – that remain joined to the body. Anthropologists, by contrast, often treat technology as an aspect of a cultural system that has a dynamic of its own, undergoing progressive development without entailing any further change in the basic biology of the species. It is as if, to all intents and purposes, technical change in humans were fully decoupled from the process of evolution, for the designs that underwrite the making process are supposed to lie in the minds of the makers, not in their genes, and to be encoded in cultural symbols rather than in strands of DNA (Wynn 1994: 137–45).

This seems like a neat way of distinguishing between the history of technicity and its evolution. But it poses a problem that has particularly exercised prehistorians, for it implies that at some point or other, history must have 'started up'. A threshold had to be crossed; our ancestors had to step beyond the old world of nature into a new world of culturally constructed meaning. This image of stone-age hunter-gatherers standing at the dawn of history sounds suspiciously like an imposition onto the Palaeolithic of a decidedly modern political rhetoric. And it has set prehistorians on a frantic and much publicised search for the point of origin of what they nowadays call 'modern humans'. I shall reserve my critique of this notion for the next chapter, and merely note at this juncture the implication that once the breakthrough to culture had been made, the history of technology must have truly taken off, leading from the earliest tools to modern machinery, without entailing any further change in the species-specific form of the human organism. History, as psychologists David and Anne James Premack maintain, consists in 'a sequence of changes through which a species passes while remaining biologically stable', and of all species in the world, only humans have it (1994: 350).

If we are to take this view, however, then we have also to admit that the artefactual products of technological culture cannot be taken as reliable indicators of the fundamental cognitive and biomechanical capabilities of their makers. A prehistorian of the future, surveying the material remains of Western industrial civilisation, would be making a serious error were he to infer that its people were considerably more advanced in their evolved capacities than were their predecessors of earlier millennia. As the linguist Philip Lieberman warns, 'who would think that we had essentially the same biological endowment as the human populations that lived 30,000 or 20,000 or 500 years ago if all he had to go on were the preserved artefacts – stone tools versus the ruins of great cities, dams, interlocking highways, etc.?' (1985: 628).

But the same argument cuts the other way. Who would think that the common human biological endowment was significantly different from that of chimpanzees on the evidence of the striking similarity between the toolkits of contemporary free-ranging chimpanzee populations and those of certain ethnographically recorded populations of human hunter-gatherers? In his controversially entitled book *Chimpanzee Material Culture*, Bill McGrew – one of the most experienced observers of chimpanzees in their natural habitat – attempts a systematic comparison of the subsistence technology of chimpanzee populations inhabiting a number of study areas in western Tanzania with that of the Aboriginal people of Tasmania, as documented in the early years of the nineteenth century. The Tasmanian Aborigines are notorious in anthropological literature for allegedly having had the simplest material culture ever recorded (Jones 1977: 197, see Figure 20.1). I shall not go into the details here of how the comparison was made, though one could have serious reservations about the selection of items for comparison and the terms in which they were rendered commensurable. I merely wish to highlight McGrew's principal conclusion, which is that
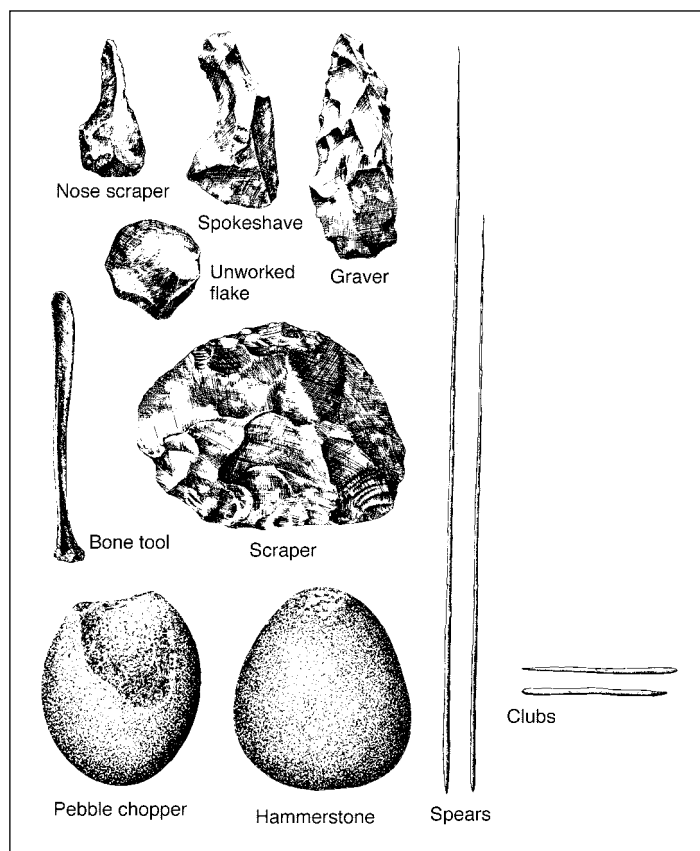
Figure 20.1   The Tasmanian toolkit.

From J. Clark, *The Aboriginal People of Tasmania*, published by Tasmanian Museum and Art Gallery, 1983, p. 22.

if we confine our attention to the respective toolkits, although the human hunter-gatherer toolkit is indeed more complicated than that of the ape, 'the difference is far from wide, and the gap between hominid and pongid is bridgeable' (1992: 144).

Not surprisingly, when McGrew first presented his findings, at a conference devoted to the anthropology of hunter-gatherer societies held in London in 1986, they drew a storm of protest. Was he really trying to tell us that Tasmanian hunter-gatherers had scarcely advanced beyond the apes, that they were stuck in an evolutionary time-warp? In his defence, his intention was no more than to suggest the possibility of an intermediate level of technology in the transition from our ape-like ancestors to the earliest hominid forms. Yet in taking nineteenth-century Tasmanian Aborigines as exemplars of early hominids, McGrew comes close to returning to the overt racism of an earlier era of anthropology, when it was quite usual to regard the 'savage' as representing an earlier stage in human biological evolution, and thus as occupying a half-way stage in the transition from apes to 'civilised' (that is, modern European) humans.

In fact the simplicity of the Tasmanian toolkit, even when compared with that of Aboriginal hunter-gatherers on the Australian mainland, presents an enigma that has never been adequately solved – though it may have something to do with Tasmania's prolonged and total isolation since rising sea-levels cut it off from the mainland some 11,000 years ago (Jones 1977). What does seem incontrovertible, however, is that a Tasmanian Aborigine, transported to the twentieth century and raised in an affluent part of the world, would have no particular difficulty in becoming, say, an airline pilot or a software engineer. But I would not, for my money, take a plane piloted by a chimpanzee! Indeed we are drawn almost irresistibly to the conclusion that behind the apparent similarity of chimpanzee and human hunter-gatherer toolkits there lies a fundamental difference of capacity, a difference that is manifested, above all, in the progression of human technology from the axe, spear and digging stick to the airplane and the computer. Thus while we might reasonably attribute the failure of chimpanzees to operate a complex technology to innate incapacity, we can

only attribute the failure of Tasmanian Aborigines to do the same to unfulfilled historical conditions.

Now the development of human technology is very commonly presented as though it could be arrayed on a continuum from the earliest stone tools to modern machinery and electronics. Figure 20.2 is an example of such a figure. Yet if the conclusion we reached in the last paragraph is accepted, to posit such a direct line of continuity from the Oldowan chopper to the space shuttle would be quite absurd. Comparing the finely flaked blades of Upper Palaeolithic hunter-gatherers, dating from around 30–40,000 years ago, with the crude pebble tools used by *Homo habilis* at Olduvai Gorge in East Africa two million years ago, it is hard to deny that the differences reflect real changes in intellectual and manipulative abilities – changes that are also reflected in the increasing size of the brain and structural modifications to the hand. *Homo habilis* was, after all, a very different kind of creature than *Homo sapiens*, in

Figure 20.2 The development of material culture.

From B. Cotterell and J. Kamminga, *Mechanisms of Pre-industrial Technology*, published by Cambridge University Press, 1990, p. 9.

many ways much closer to an ape than a human being. On the other hand, it would appear that once a recognisably human level of competence had been achieved, all subsequent technological change – from Palaeolithic hunting and gathering to modern industry – could take place without any significant further change in the basic biological endowment of the species.

In short, it appears that whereas the change from Lower to Upper Palaeolithic tools is a chapter in the story of human evolution, the change from the latter to modern industrial technologies is a chapter of history. When we speak of evolution, it is assumed that changes in tools depend on – and can therefore be taken as indices of – changes in the forms and capacities of the creatures that use them. When we speak of history, by contrast, it is as though technology had broken free from the bonds of genetic constraint, and could henceforth undergo unlimited development without entailing any enhancement of innate human capacities. At what point, then, does the evolution of technology become the history of technology? How can we draw a dividing line between these two processes? Is it possible even in principle, let alone in practice, to distinguish those actions and events that carried forward the movement of human history from those that set it in motion in the first place? We are very far from resolving these questions, but I would like to conclude

my discussion of this theme with the suggestion that the processes of evolution and history may not be so distinct after all.

The notion of capacity seems to imply a certain view of human nature, as comprising a set of universal structures or compartments, fully formed in the life of every individual from the start, and waiting to be filled up with all manner of particular cultural content. Thus the capacities are said to be innate, the products of an evolutionary process; the content acquired, changing through history. However my discussion of skill in the last chapter led me to conclude that the capabilities of action of both human beings and non-human animals are neither innate nor acquired but emergent properties of the total developmental system constituted by the presence of the agent (human or non-human) in its environment. In the case of humans, this is as true of the most widely distributed skills such as walking and speaking as it is of those of more restricted distribution such as swimming and writing.

We cannot, then, place universals on the side of evolution and particulars on the side of history. Rather, if history be understood as the process wherein people, through their activities, establish the conditions under which succeeding generations lead their lives, developing as they do the skills appropriate to these various forms of life, then it cannot differ in principle from the process in which organisms, quite generally, establish by their own presence and actions the context of development for their successors. That process is one of evolution. To understand evolution in this sense, however, is to make a clean break with the conventions of modern biology, and with the neo-Darwinian paradigm upon which they are founded. For it is to attribute the changing forms and capacities of living creatures not to changes in an internal programme, design or building plan (the genotype), but to transformations in the whole field of relationships within which they come into being. To take this idea further would be beyond the scope of the present chapter. It is, however, my subject for the next.

MEASURING TECHNOLOGICAL COMPLEXITY

Is there, then, anything progressive about technical change? It is remarkable that although the majority of anthropologists are deeply suspicious of the idea that there is any inherently progressive tendency in the history of human culture, they are inclined to make an exception of technology, and are quite content to talk about peoples with 'simple' and with 'complex' technologies. Precisely how the simplicity or complexity of a technology is to be gauged, however, has remained far from clear. One of the few attempts to construct such a measure has been made by Wendell Oswalt (1976). Oswalt defined the complexity of a tool by the number of 'technounits' that make it up. A technounit is a physically distinct part that makes a particular contribution to the overall implement. It was in these terms that McGrew compared the relative complexity of chimpanzee and human hunter-gatherer technologies. He found that none of the tools used by chimpanzees in the procurement of subsistence comprised more that one technounit, whereas the mean number of technounits (1.2) for the Tasmanian Aboriginal repertoire was very slightly greater. In fact, no Tasmanian implement was of more than one technounit; the raised mean is fully accounted for by two kinds of fixed facility used in hunting, involving two and four technounits respectively (McGrew 1992: 138, 144). By contrast, the Inuit (Eskimo) sealing harpoon shown in Figure 20.3 has no fewer than 26 structurally distinct components.

On the basis of a comparative survey of the toolkits of hunter-gatherers, farmers and herdsmen, Oswalt was able to refute the common assumption that hunters and gatherers

have simpler tools than any other human groups. In fact the most complex tools were found among specialised hunters, especially hunters – like the Inuit – of large aquatic mammals, who have to use considerable ingenuity to obtain inaccessible or potentially dangerous prey. The herdsman, who has ready access to comparatively docile animals, faces nothing like the same technical challenges, and his toolkit is correspondingly simpler: thus the lasso, the principal instrument by which the reindeer herdsman catches hold of his animals, is no more than a length of rope tied to a sliding toggle (Ingold 1993b). The equipment of the gatherer tends to be simpler than that of the hunter (plants do not attempt to escape those who 'hunt' them, nor do they have to be outwitted or outmanoeuvred), but again, the tools of the farmer are no more complex. For both gatherer and farmer, the essentials may consist of just an axe or adze, digging stick, and some form of carrying device for transporting harvested produce.

But comparisons based on the structural properties of the tools themselves can be misleading. Returning the objects to the contexts of their use reveals a different picture. The Inuit harpoon is a rather specialised piece of equipment, which is used *only* for sealing. The reindeer herdsman's lasso, by contrast, can be put to use in all

Figure 20.3 Inuit (Angmagsalik) toggle-headed 'feather' harpoon and throwing board for hunting large seals from a kayak.

Drawing by Patrick Finnerty, from W. H. Oswalt, *An Anthropological Analysis of Food-Getting Technology*, published by John Wiley & Sons, 1976, p. 100.

manner of different ways. I have seen herdsmen use their lassos for setting traps, for tying animals to sledges for transport home, and for countless other purposes. Likewise among hunter-gatherers with an apparently simple inventory of tool types (including Tasmanian Aborigines), it is common to find that each kind of object is turned to an account for an astonishing variety of different tasks.

Among the Aboriginal people of the Australian Western Desert there is a clear division between men's tools (principally the spear and spear-thrower) and women's tools (principally digging sticks and wooden bowls). The spear-thrower, in the context of hunting, is designed to enhance the flight of the spear by imparting extra angular momentum to the throw. But it has numerous other uses: as a friction stick in making fire, a woodworking tool (with the addition of a hafted stone adze-flake), a mixing tray for pigments or tobacco, a percussion instrument in songs and dances, a device for clearing an area of thorns and pebbles when preparing a campsite, and (when embellished with decorative markings) a mnemonic for recalling the sequence and locations of waterholes and other features of the landscape (Gould 1970: 22, Figure 20.4). The woman's digging stick is similarly multifunctional. It can be used to obtain burrowing animals as well as plants, as a weapon in

small-game hunting and in self-defence. Small wooden bowls can be used to carry produce, but also to shovel away soil when digging. Large bowls can be used to carry both infants and drinking water (Hamilton 1980: 7).

Comparing Australian Aboriginal and Inuit toolkits, it might seem at first glance that the first is extremely simple and the second rather complex. But a more significant difference is between the economy and versatility of the Australian toolkit and the diversity and specialisation of the Inuit one. Australian Aboriginal people have few tools, but use them in whatever way they come in handy, for manifold purposes that we might never come to think of when we classify the objects by function – for example, as spear-throwers or digging-sticks. Inuit have many tools, some of them – like the harpoon – of great complexity and ingenuity, but each is used for a prescribed purpose which governs, at least to some extent, the manner of its construction. It is only because of a peculiar bias that leads us to look for technical operations in the properties of the tools themselves, rather than in the know-how of their users, that we are led to conclude that Inuit are somehow more 'advanced', in the technical sphere, than Australian Aborigines. As I have already shown (Chapter Sixteen, p. 315), the source of this bias lies in the concept of technology itself.

These observations all point towards a single conclusion: that to comprehend the technical accomplishments of hunter-gatherers, or of any other people for that matter, it is not sufficient just to look at their tools. We have to understand their *knowledge*. Tools are of no use if you don't know how to work with them; moreover up to a point, the simpler the tool, the more knowledgeable and skilled you have to be to be able to work it effectively. The reindeerman's lasso is a simple tool, but it requires immense skill to

Figure 20.4 Decorated spear thrower from the Nyatunyara people of the Australian Western Desert. Designs depict waterholes and landmarks along the track of a totemic snake.

From R. A. Gould, Spears and spear-throwers of the Western Desert Aborigines of Australia, *American Museum Novitates*, 1970, p. 28. Courtesy of the American Museum of Natural History

use it effectively. The same could be said of an axe, digging stick, spear or boomerang. The food processor on my kitchen table is, by contrast, an extremely complex tool, with hundreds of interconnected parts. But it took only a few minutes to learn to use it.

As Robin Ridington has put it (1982: 470), understanding technical know-how means focusing on *artifice* rather than *artefacts*, on tool-use as skilled practice rather the mechanical operation of exterior devices. But by artifice we do not mean the kind of objective, generalisable, scientific knowledge which, in its application, might be covered by the modern concept of technology. It is rather knowledge of a very personal kind, partly intuitive, largely implicit, and deeply embedded in the particularities of experience. One grows into such knowledge much as one learns one's country or one's kinship system. It is knowledge that both enables a person to find his or her way in a world of human and non-human others, and that endows them with a specific identity. Thus, as we saw in Chapter Sixteen, it is indistinguishably social and technical.

THE ORGANIC ANALOGY

The idea that in the history of human technology, tools and machines have evolved according to principles similar to those governing the evolution of organic species is an attractive one that has had numerous adherents, from Marx, Butler and Pitt-Rivers in the nineteenth century to contemporary advocates of 'evolutionary archaeology' who argue that mechanisms of variation, differential replication and retrospective selection will account just as well for artefactual as for organic change.[2] All the necessary conditions seem to be present, in the technological domain, to support the analogy. There is *diversity*, which, if anything, is greater than that of species. George Basalla, for example, notes that the number of patents issued in the United States since 1790 (4.7 million) is more than three times the number of species of flora and fauna yet identified (Basalla 1988: 2). There is *continuity*, in the sense that technical change, by and large, seems to be gradual, amassed from a very large number of minor variations rather than punctuated by momentous steps of absolute invention. There is *novelty*, insofar as all making activity, however closely it strives to copy an existing model, is bound to diverge from it to some degree. Replication, in practice, can never be perfect. And finally, there is *selection*, albeit artificial rather than natural, in that it is guided by human intention in rather the same way as in the practice of animal or plant breeding. In other words, the context for the differential replication of technical variants is human, and therefore social and historical (Basalla 1988: 25).

Arguments for the analogy between organic evolution and technical change, though they vary in detail, generally run roughly as follows. In the replication of existing technical designs, innovations of one kind and another inevitably creep in. Some of these may be entirely accidental, and in that respect resemble genetic mutations. Others are clearly stimulated by the particular conditions in which the object or technique in question is to be applied: to the extent that this is the case, the evolutionary process is often said to be more 'Lamarckian' than 'Darwinian'. Another way of putting this would be to define Darwinian evolution as the special case in which the degree of coupling between a novel variation and its environmental conditions of selection is reduced to zero (Ingold 1996b: 196–7). Whether accidental or premeditated, the majority of innovations will probably turn out in practice to be useless or even detrimental. A small proportion, however, bring evident benefits. Variants that work well in the particular conditions prevailing in the environment will tend to 'catch on', through extensive replication, while others will dwindle

and disappear. Thus in the long run, the more successful technical designs will undergo a kind of adaptive radiation, splitting into diverse forms suited to specific contexts of use, while others may become effectively extinct.

One of the virtues of the organic analogy is that it suggests a way of explaining how the majority of extant techniques and artefacts have come to be so admirably adapted to current requirements, without our having to suppose that they appeared from nowhere, dreamt up in a moment of inspiration by a designer who was somehow able to see the totality of every problem and conceive its solution in a vacuum. It is no more possible in the history of artefacts than in the evolution of species for new forms to appear out of thin air. Every object, and every technique, comes with a history attached, or as Basalla puts it, 'every novel artifact has an antecedent' (1988: 208–9). True, in the history of artefacts the selection involved carries a component of intentionality: human beings may be able to author their own designs in a way that other animals cannot. What they cannot do, however, is stand outside of history and treat the world as though it were a blank slate. Every designer is a creature of his or her own time, and the objects and practices with which each is surrounded, bequeathed through the activities of predecessors, form a necessary resource for the design process itself. That is why, as Reuleaux pointed out in his *Kinematics of machinery* of 1876, most of what goes for invention in the technical sphere consists in hitting on new uses for old things.

'The first machinal arrangements', Reuleaux argued, 'were of a kind which we may designate as make-shifts'. Cobbled together for one purpose, these arrangements were pressed into service for others, coming up against new demands for improvement which were met by further rearrangements, and so on.

> Very gradually each invention came to be used for more purposes than those for which it was originally intended, and the standard by which its excellence and usefulness were judged was gradually raised. An external necessity thus demanded its improvement, and from this cause machinal ideas slowly crystallised themselves out, and gradually assumed forms so distinct that men could use them designedly in the solution of new problems. These attempts resulted in further improvements, and these in their turn led once more to new applications and more extended use.
>
> (Reuleaux 1876: 231)

Only a few years previously, in his treatise of 1862 *On the various contrivances by which British and foreign orchids are fertilised by insects*, Darwin had advanced a precisely analogous argument to account for the evolution of mechanisms in nature. In order to facilitate the transfer of pollen, Darwin showed, the orchid uses whatever parts happen to be available, parts that may have arisen as adaptations to quite different functions.

> Although an organ may have been originally formed for some special purpose, if it now serves for this end, we are justified in saying that it is especially contrived for it. On the same principle if a man were to make a machine for some special purpose, but were to use old wheels, springs and pulleys, only slightly altered, the whole machine, with all its parts, might be said to be specially contrived for that purpose. Thus throughout nature almost every part of each living being has probably served, in a slightly modified condition, for diverse purposes, and has acted in the living machinery of many ancient and distinct specific forms.
>
> (Darwin 1862: 348)

As Darwin showed, natural selection, in adapting organisms to their conditions of life, continually puts old structures to work in new ways, having no other materials on which to work. More than a century later we find the same idea echoed in the work of the distinguished biologist, François Jacob. The process of organic adaptation under natural selection, for Jacob, is akin to 'tinkering'. The mammalian ear, for example, is derived from a part of the jaw of the fish, and birds' feathers, with their aerodynamic properties, are derived from hairs once designed for insulation (Jacob 1977).

As with organisms so with artefacts, every novelty is but an expedient solution to a very specific, context-bound, local difficulty: it is a matter of getting by with what is already available rather than producing the absolutely new. Thus it is an illusion to suppose that anything is ever perfectly fit for the purpose to which it is used. 'Every thing we design and make', writes David Pye, 'is an improvisation, a lash-up, something inept and provisional. We live like castaways . . .' (1964: 10). More often than not, the stock of materials available to the maker consists of previously made things, constructed for other purposes but now co-opted for the project in hand. This is the kind of making that Claude Lévi-Strauss famously likened to *bricolage*. The *bricoleur* is someone who delights in making novel contraptions out of the bits and pieces of old ones. The inventory of tools and materials he has to work with, as Lévi-Strauss explains, 'bears no relation to the current project, or indeed to any particular project, but is the contingent result of all the occasions there have been to renew or enrich the stock or to maintain it with the remains of previous constructions or destructions' (1966b: 17). In the history of human technology, perhaps the outstanding example of *bricolage* lies in the so-called 'invention' of writing. Let me pause to say a few words about it.

The nameless inventors of the earliest scripts – and there seem to have been several, who arrived at the same idea quite independently – did not first conceive in the abstract, and then proceed to construct, full-blown, purpose-built writing systems. They did not even imagine the possibility of writing as we think of it now. What they did was simply to hit on the idea that a graph or diagram depicting a thing could be used instead to represent the sound of the word for that thing – a sound which could be homophonous with words or parts of words for other things. This, the so-called rebus principle, has been hailed as 'one of the greatest inventions of human history' (DeFrancis 1989: 50). Yet its significance has been hugely exaggerated by indirect and largely fortuitous consequences of which its originators can have known nothing. All they were doing was pressing into service, on an *ad hoc* basis, well-known and easily identifiable icons for the new purpose of representing speech sounds, in order to solve such limited problems as keeping accounts, recording proper names or divining fortunes. What modern historians rather grandly call 'writing systems' undoubtedly developed as accumulations of expediences of this kind. DeFrancis is right to describe them as 'jerry-built structures' that 'bear less resemblance to carefully constructed schemes for representing spoken languages than they do a hodgepodge of mnemonic clues that adept readers can use to arrive at coherent messages' (1989: 262). In short, they are more like Rube Goldberg devices than the exemplary instances of engineering design that the popular notion of writing as a technology of language would lead us to expect.[3]

Now organisms, it would appear, have evolved in rather the same way as writing systems. Jacob, it will be recalled, likened natural selection to a tinker, and a similar image is invoked by another leading contemporary exponent of Darwinian thinking, Michael Ghiselin: 'organic mechanisms may be shown . . . to have been haphazardly thrown together, out of whatever materials the moment happened to supply' (Ghiselin 1969: 153).

In one respect, however, this kind of image is seriously misleading. For real, living organisms are not pieced together out of ready-made components, however fragmentary, heterogeneous and diverse in origin. Rather, they undergo growth and development in an environment. Thus to be more precise, the tinkering – if such it is – must occur not in ontogeny but in phylogeny, that is in the assemblage, by natural selection, of a *design* or construction blueprint for the organism. This design is what is generally known as the genotype. And if the same argument is to be applied by analogy to the construction of artefacts, we would have to conclude that what is fashioned, through a process of variation under selection, is likewise a design for the tool or machine in question rather than the object itself.

My discussion in Chapter Eighteen, however, led me to question the very idea that the making of artefacts consists of a simple transcription of a prior design onto raw material. I argued, to the contrary, that the forms of artefacts *emerge* through the unfolding of a system of relations comprised by the presence of the artisan in a richly structured environment that could include other persons, other examples of artefacts of the kind that it is desired to make, a selection of materials, and a range of tools and supporting surfaces. Should we conclude, then, that the analogy does not hold; that the processes that give rise to organisms and artefacts are profoundly dissimilar? Could it be, in complete reversal of commonsense understanding, that whereas organisms are built, artefacts grow?

I think not. The analogy is indeed sound. It is, in short, not that organisms are built like artefacts, knocked together out of bits and pieces as the Darwinian model suggests, but rather that artefacts grow like organisms, within the equivalent of a morphogenetic field. Where plans or blueprints exist, as they often do in the fields of architecture and engineering, they are generated within the same, environmentally situated process from which also emerge the forms they are said to specify. But they may not exist at all. Thus where apparently identical objects are made, generation after generation, this is not because each is a replica run off from a template that has been somehow transmitted from ancestors to descendants, independently and in advance of the construction process. It is rather, as we saw in the case of the making of string bags described in Chapter Nineteen, that form-making involves a precise co-ordination of perception and action that is learned through copying the movements of experienced practitioners in socially scaffolded contexts. Making, in other words, *is* copying; it is not the realisation of a design that has already been copied. The same point could be alternatively expressed in terms of a contrast between *reproduction* and *replication*: every artefact, formed as it is within the process of production, is an original, not a replica. And whatever variations may be introduced in the process lie in the dynamics of making, not in errors of transmission.

Now I believe that precisely the same argument may be applied to the growth of organisms. The transgenerational stability of organic form is due to the dynamics of reproduction, not to the mechanics of replication. In each generation the form emerges anew, in the course of ontogenetic development; it is not run off from a pre-existing design specification. Indeed for organisms, there is no such specification. The genotype, conceived as a programme or blueprint for the growth of the organism, does not exist. To recall my conclusion from the first part of this chapter, the forms and capacities of organisms are attributable not to genes but to the properties of developmental systems (of which the genes are, of course, an integral part). An exploration of the radical implications of this conclusion for evolutionary theory is my subject for the next chapter.

Chapter Twenty-one

'People like us'
The concept of the anatomically modern human

INTRODUCTION: THE ORTHODOX VIEW

Let me begin with a rather facetious question. Why did Cro-Magnon Man not ride a bicycle? I shall first elaborate on the answer that will surely seem obvious: it is not that he lacked the basic anatomical prerequisites to perform such a feat, but simply that he lived in an era long before anything as ingenious and complex as a bicycle had been developed. And even if it had, given the nature of the terrain and the prevailing mode of subsistence, a bicycle would probably have been of little use to him. In other words, although biologically prepared to take to the saddle, the cultural conditions that would make cycling a practicable option were not yet in place. I intend to show, however, that this answer is seriously flawed, and that the search for a more satisfactory alternative forces a fundamental revision of our most basic notions of evolution, of history and indeed of humanity itself. In particular, I shall argue that the idea of the 'anatomically modern human', the pivot around which all these other notions revolve, is an analytic fiction whose principal function is to cover up a contradiction at the heart of modern evolutionary biology.

Cro-Magnon Man, unearthed by Louis Lartet in the village of Les Eyzies, France, in 1868, has of course acquired the mantle of the prototypical 'modern', albeit by no means the earliest representative of its type in the fossil record. Compared with its predecessors – the 'archaic' Neanderthals and, before that, *Homo erectus* – this type was recognisably different: a kind of man, as William Howells wrote, 'who was entirely like ourselves' (1967: 240). In contemporary palaeoanthropology, the Cro-Magnons are included, along with all subsequent and present-day human populations, within the single sub-specific taxon *Homo sapiens sapiens*. And the implication of such categorisation is that, at least so far as their biological endowment was concerned, these Upper Palaeolithic people fell well within the existing range of variation of the sub-species. Had they been born in our own time, and grown up in a society like our own, they would undoubtedly have been able to do all the things we can: read and write, play the piano, drive cars, ride bicycles, and so on. That is, they had the *potential* to do all these things, a potential that nonetheless remained unrealised in their own lifetimes.

Now I should like to return to Howells's characterisation of the Cro-Magnons, as people 'entirely like ourselves', bearing in mind that at this stage of the argument my purpose is to spell out what I believe to be the orthodox position in current anthropology. Somebody might object that they were not like us at all. They did not, after all, live in cities, read books, write scientific monographs, play the piano or drive cars. To this kind of objection, two responses are immediately forthcoming. One is to point out that the objection rests on a narrow and ethnocentric view of who 'we' are, a view that would exclude a

large proportion even of contemporary humanity. In comparing Upper Palaeolithic people to ourselves, the reference is to humankind in its global distribution, irrespective of cultural variation. The other response is to qualify the sense in which the people are said to have been 'modern'. This should not be confused with conventional usage in social and cultural anthropology, in which modernity has generally been linked to some notion of Western urban-industrial society. The Cro-Magnons were modern in an *anatomical*, not in a socio-cultural sense. They were 'like us' biologically, but not culturally.

What separates the anatomically modern humans of thirty thousand years ago (and earlier) from their contemporary descendants, according to orthodox theory, is a process not of evolution but of history – or as some would have it, of cultural rather than biological evolution. This is not to suggest that with the advent of the 'moderns', the evolution of our species literally stopped. There have been continuing changes, but these have been relatively minor, and pale into insignificance beside the truly colossal transformations in ways of life that have occurred – apparently at an escalating rate – throughout the course of human history. Whether, or in what sense, these transformations can be considered progressive has been hotly debated: nevertheless it seems to be generally agreed that the history of culture has been marked by a cumulative increase in the scale and complexity of its technological component. Not only, however, was the historical process of complexification in the technological sphere of culture made possible by a biological endowment that was already established by the Upper Palaeolithic; it also left that endowment unaffected. The motor car is a modern invention, but the man behind the wheel remains a creature biologically equipped for life in the Stone Age!

Thus so far as their basic biology is concerned, cyclists are no different from walkers, and the walkers of today are no different from their predecessors of the Upper Palaeolithic. It is generally accepted that bipedal locomotion is a universal human characteristic, whose evolution entailed a distinctive suite of anatomical adjustments (Lovejoy 1988). Cycling, by contrast, is an acquired skill which has appeared relatively lately in some, but not all human populations. Though its advent was conditional upon a long chain of prior circumstances of invention and diffusion (from the discovery of the wheel to the manufacture of steel tubing), as well as of environmental modification (the construction of roads and tracks), it entailed no reconfiguration of human anatomy. In its structure and proportions, after all, the bicycle was designed to 'fit' a human body that had already evolved for walking, and its essential mechanical function is to convert bipedal into rotary motion.

This brings us back to the conventional answer to the question with which I began. The reason why Cro-Magnon Man did not ride a bicycle has nothing whatever to do with biology. That is, the reason is historical rather than evolutionary. The same distinction, as we saw in the last chapter, is generally invoked to explain why the toolmakers of the Upper Palaeolithic worked with flaked stone rather than complex mechanical or electronic equipment. And if it is absurd to posit a direct line of continuity from the very earliest stone tools to modern machinery, then it is equally absurd to posit a similar progression from quadrupedal to bicyclic locomotion. For whereas the transition from walking on four feet to walking on two belongs to evolution, the transition – if you will – from two feet to two wheels belongs to history.

WALKING AND CYCLING

I trust it will be agreed that this is a fair representation of the orthodox view. I shall now go on to show why I think it is wrong. Let me begin by taking a fresh look at the contrast

between walking and cycling. It is commonly supposed that walking is something we are 'born with' whereas cycling is a product of enculturation; in other words the former is presumed to be innate, the latter acquired. Yet the fact is that new-born infants cannot walk. They have to *learn* to walk, and the help of older persons, already competent in the art, is invariably enlisted in the enterprise. In brief, walking is a skill that emerges for every individual in the course of a process of development, through the active involvement of an agent – the child – within an environment that includes skilled caregivers, along with a variety of supporting objects and a certain terrain (Ingold 1991: 370). How, then, can we continue to maintain that it comes, as it were, 'pre-packaged' in the human biogram? True, the vast majority of human infants do learn to walk, moreover they do so within a fairly narrowly defined period. Thus while the baby does not exactly land in the world on two feet, it comes with a built-in developmental schedule which ensures that it will eventually walk upright provided, however, that certain conditions are present in its environment.

This last proviso is absolutely critical. Infants deprived of contact with older caregivers will not learn to walk – indeed they would not even survive, which is why all surviving children *do* walk, unless crippled by accident or disease. One could imagine a future scenario in which human locomotive needs were met entirely by wheeled vehicles, or of life under conditions of weightlessness in outer space, where walking would disappear. Such scenarios are admittedly fantastic, but to imagine them serves to reinforce my point, which is that the capacity for bipedal locomotion can only be said to be innate by presupposing the presence of the necessary environmental conditions for its development. Strictly speaking, therefore, bipedalism cannot be attributed to the human organism unless the environmental context enters into the specification of what that organism is.

With this point in mind, let me turn from walking to cycling. Children can only become proficient in cycling, as in walking, through a process of learning in which adult assistance is generally required. Compared with walking, however, the conditions for the development of cycling are a good deal more stringent. Obviously, no-one can learn to cycle who does not have a bike to ride, and the environment must also include roads or tracks that are negotiable on two wheels. In contemporary industrial societies these conditions are so ubiquitously present that we tend to think it as natural that children beyond a certain age should be able to cycle as it is that they can walk. In other societies, by contrast, bicycles may be rare or absent altogether, or the terrain may be quite unsuited to their use. And so the skills of cycling are of far more limited distribution than those of walking.

This is a difference, however, of extent rather than principle. If walking is innate in the sense – and only in the sense – that *given certain conditions*, it is bound to emerge in the course of development, then the same applies to cycling. And if cycling is acquired in the sense that its emergence depends on a process of learning that is embedded in contexts of social interaction, then the same applies to walking. In other words, it is as wrong to suppose that cycling is 'given' exogenously (independently of the human organism) as it is to suppose that walking is 'given' endogenously (independently of the environment). Both walking and cycling are skills that emerge in the relational contexts of the child's involvement in its surroundings, and are therefore properties of the developmental system constituted by these relations.

Moreover these skills are literally *embodied*, in the sense that their development entails specific modifications in neurology, musculature, and even in basic features of anatomy. Though children generally learn to walk before they learn to ride, the modifications entailed

in cycling are not simply inscribed upon an anatomy that comes, as it were, 'ready-made' for walking. For the human body is not ready-made for anything, but undergoes continuous change throughout the life-cycle as it is pressed into the performance of diverse tasks. Indeed the recurrent stresses and strains of everyday life do not just affect the relative development of different muscles; they also leave their mark on the skeleton itself. Thus carrying loads on the head affects the bones of the upper spine; squatting puts a strain on the knee, resulting in a notched kneecap, and no doubt cycling, too, leaves tell-tale signs.[1] It is of course true that the bicycle is designed for a creature already accustomed to bipedal locomotion, so that cycling calls for no *major* overhaul of human anatomy. Cyclists can still walk, and it is doubtful whether even the most percipient observer could distinguish a cyclist from a non-cyclist, save by putting them to the test. However the facts that no novice has succeeded in sustaining balance and co-ordination on a first attempt, and that the knack of riding a bicycle, once learned, is never lost, indicate that the exercise of the requisite sensory and motor skills leaves an indelible anatomical impression, if only in the normally invisible architecture of the brain. Indeed, this conclusion is supported by recent neurological research which shows, as Kandel and Hawkins report, that 'our brains are constantly changing anatomically', even as we learn (1992: 60).

In the light of these considerations, it is perhaps not so absurd, after all, to situate the emergence, respectively, of walking and cycling within the same overall process of evolution – an evolution, that is, of the developmental systems which underwrite these capacities. For once we introduce the environmental context of development into our specification of what an organism is, it must follow that a human-being-in-environment-A cannot be the same kind of organism as a human-being-in-environment-B. Thus Cro-Magnon Man was indeed a rather different kind of creature from the cycling or car-driving urban dweller of today. He was not 'like us' – not even biologically. He may have resembled us *genetically*, but that is another matter. How it was that biology came to be identified with genetics is a problem in the history of ideas to which I return below; suffice it to say at this juncture that such identification is already implicit in the notion that every individual receives his or her biological constitution, at the moment of conception, in the form of an *endowment*. Before examining this notion more closely, I should first like to review an area in which very similar issues arise to those raised in my comparison of walking and cycling, but which has been the site of far more serious controversy: namely, the evolution of language.

SPEECH AND WRITING

It is generally recognised that Cro-Magnon Man, as a paragon of anatomical modernity, had a fully-fledged capacity for language. He could speak just as well as you or I. But he could neither read nor write. I begin with the comparison between speech and literacy, since it bears the most obvious parallel with that between walking and cycling. Thus according to the orthodox view, the capacity for language is a human universal, something that we all receive as part of a common biological endowment that was in place by the Upper Palaeolithic, if not earlier (I am not here concerned with the arguments over dating). Literacy, by contrast, is a technology of language that arose independently in various parts of the world as a result of specific events of invention and diffusion, and which – even today – is by no means universally shared. The capacity for language, then, is a product of evolution; the capacity to read and write a product of history. The former

is said to be innate, the latter acquired. Cro-Magnon's failure to read and write, like his failure to ride a bicycle, had nothing to do with his biology. It was rather that, in the epoch during which he was living, the cultural developments that culminated in the invention of writing systems had yet to run their course.

I believe this view is wrong, for reasons that I have already spelled out. Human babies are not born talking, any more than they are born walking. Their capacity for language *develops*, through a series of fairly well-defined stages. The support of speaking caregivers, and the presence in the environment of a rich and highly structured array of significant features, are essential for normal language development. Since these conditions are almost invariably fulfilled, the overwhelming majority of children learn to speak without difficulty, and the exceptions are those whose development is impeded by some other handicap. The conditions that have to be fulfilled if a child is to learn successfully to read and write are, of course, far more restricted. Indeed, just what these conditions are is a matter of vigorous debate, especially in educational circles. Since literacy skills and practices are in fact exceedingly diverse, having no more in common than the representation of words in a graphic medium, the conditions necessary for their acquisition are, in all probability, equally variable (Street 1984). But this does not affect my main point, namely that literacy is not 'added on', through enculturation, to a human constitution that is biologically ready-made for speech. Rather, the abilities both to speak and to read and write emerge within a continuous process of bodily modification, involving a 'fine-tuning' of vocal-auditory and manual-visual skills together with corresponding anatomical changes in the brain, and taking place within the contexts of the learner's engagement with other persons and diverse objects in his or her environment. Both capacities, in short, are the properties of developmental systems.

Without prejudging the vexed issue of whether the so-called 'archaic' humans, typified by Neanderthal Man, could speak, there is considerable agreement among contemporary palaeoanthropologists that this capacity – at least in its fully-fledged form – was not shared by earlier, pre-human hominids such as *Homo erectus* and *Homo habilis*. The question we need to ask, however, is this: in what way, if at all, did the failure of these early hominids to speak differ from the failure of Upper Palaeolithic hunter-gatherers to read and write? To recall a distinction I introduced in the last chapter (pp. 364–5), in the context of a comparison of the technical capabilities of chimpanzees and human hunter-gatherers, how can we justify the attribution of the former to innate incapacity, when the latter is attributed to unfulfilled historical conditions? If Cro-Magnon Man, had he been brought up in the twentieth century, could have mastered the skills of literacy, why should not *Homo erectus*, had he been brought up in the Upper Palaeolithic, have mastered language?

A somewhat comparable question arises in the context of research into the linguistic capacities of great apes, especially chimpanzees. Reared under 'natural' conditions – that is, without significant contact with humans – chimpanzees do not learn to speak. Yet recent research shows fairly convincingly that chimpanzees reared in a human environment with speaking caregivers are capable of the spontaneous acquisition of linguistic syntax and semantics of a complexity equivalent to that used by small children (Savage-Rumbaugh and Rumbaugh 1993). Does this prove that contrary to expectations, chimpanzees – and by analogy, early hominids – do or did have a capacity for language, albeit of a limited sort? Are we to believe that thanks to the legacy of their common ancestry with humans, such a capacity is pre-installed, as an hereditary endowment, in the mind of every individual chimpanzee, merely awaiting propitious environmental circumstances for it to be 'brought out'?

I think not, for the question itself rests on a false premise, namely that the capacity for language is something whose presence or absence may be attributed to individuals of a species, irrespective of the environmental contexts of their development. Indeed it makes no sense to ask whether chimpanzees or hominids 'have' or 'had' language, as though it were programmed into them from the start. The biological definition of species depends upon the possibility of a context-independent specification: thus a chimpanzee is a chimpanzee, *Pan troglodytes*, whether reared among other chimpanzees or among humans, whether in the forest or in the laboratory. Yet the chimpanzee-in-an-environment-of-other-chimpanzees is not at all the same kind of animal as the chimpanzee-in-an-environment-of-humans: the latter may be credited with a rudimentary capacity for language which the former lacks. This capacity, as Dominique Lestel has pointed out, is the outcome of a process of development situated in the peculiar context of the hybrid human–animal community set up for the purposes of ape-language research (Lestel 1998: 13). And while this context may seem rather exceptional, it is nevertheless true of any process of development that it must involve an organism in relationships that cross-cut the boundaries of conventional taxonomic groupings. It follows that if a capacity – like language – can be shown to arise as an emergent property of the developmental system comprised by these relationships, then it cannot be attributed to a species. (Conversely, to attribute language to species is automatically to have resort to an innatist view that involves some kind of neural 'hard-wiring' that comes miraculously ready-made.)

The notion of the 'capacity for language' is itself deeply problematic. The orthodox account, which attributes this capacity to 'anatomically modern humans', requires that it be clearly distinguished, as a human universal, from the capacity to speak *this* language rather than *that*. Competence in one's particular mother-tongue is supposed to be a product of enculturation rather than given as part of one's biological endowment as a member of the human species. But human children are not 'born with' an innate programme (a language acquisition device) for assimilating an acquired one (in the form of the rules of syntax for a particular language). For whatever devices may be deployed in the process of language acquisition have themselves to undergo formation within a developmental context which is the very same as that within which the child learns the language of his or her community. There are not, in other words, two distinct and successive processes – the first 'wiring up' the brain for language, the second providing specific syntactic and semantic content – for it is in learning to speak in the manner of the people in his or her surroundings, and with their active assistance and support, that the neurological connections underwriting the child's linguistic competence are forged. Consequently, speakers of different languages, exposed at critical stages of development to different patterns of acoustic stimulation in different environments, will also differ in those aspects of their neural organisation that are involved in the production and interpretation of vocal utterances.[2]

In short, it is only by artificially separating out the more general from the more particular aspects of the total developmental system within which the skills of speaking emerge that 'language' can be identified as a universal capacity as against the speaking of one language rather than another. And in this respect, speaking is much like walking. There are, indeed, as many different ways of walking as there are ways of speaking. But as Esther Thelen and her colleagues have shown, in a series of studies of infant motor development, there is no 'essence' of walking that can be isolated from the real-time performance of the action itself (Thelen 1995: 83). Thus to refer to 'bipedal locomotion' or to 'language' as a universal attribute, distinct from the manifold skills of walking or speaking as these

are actually deployed in the everyday life of human communities, is to reify what is, at best, a convenient analytic abstraction. Moreover speaking, like walking, is an achievement of the whole human organism, it is not merely the behavioural output of a cognitive mechanism installed within the organism, and for which it serves as a vehicle. Thus both walking and speaking are, in Mauss's phrase, 'techniques of the body' (1979 [1934]: 97–123). We carry these techniques with us in the ways that our bodies have been formed in and through the developmental process.

The corollary of this conclusion, however, is quite radical. It is to overturn, once and for all, the deep-seated presumption that those differences in language, body posture and so on that we are inclined to call *cultural* are superimposed upon a pre-constituted substrate of human biological universals. We can no longer remain content with the facile notion that all human beings start out (biologically) much the same and end up (culturally) very different. Consider, for example, this formulation from Geertz: 'One of the most significant facts about us may finally be that we all begin with the natural equipment to live a thousand kinds of life but end in the end having lived only one' (1973: 45). My point, *contra* Geertz, is that human beings are not naturally pre-equipped for any kind of life; rather, such equipment as they have comes into existence as they live their lives, through a process of development. And this process is none other than that by which they acquire the skills appropriate to the particular kind of life they lead. What each of us begins with, then, is a developmental system. It follows that cultural differences – since they emerge within the process of development of the human organism in its environment – *are themselves biological*. Before examining the implications of this result, I must take a step back, to show how it was that biology and culture came to be separated in the first place. With this, I return to a reconsideration of the notion of 'biological endowment'.

THE GENOME AND THE GENOTYPE

As I have already indicated, anatomically modern humans are supposed to be biologically endowed not only with bipedalism but also with a host of other attributes from language to advanced cognitive and manipulative abilities, all of which are often lumped together under the general rubric of the capacity for culture. Let me remind you of Lieberman's comment, which I cited in the last chapter, that despite all the monuments to human technological advance which litter the landscape, present-day people have 'essentially the same biological endowment' as their predecessors of 30,000 years ago. That endowment, then, must be bequeathed to individuals in every successive generation, independently of the diverse environmental contexts in which they grow up as walkers or cyclists, as stone toolmakers or machine tool operators, as hunter-gatherers or city dwellers, and so on. In other words, it amounts to a context-independent specification of the human organism, given to each and every member of the species at the point of conception.

In modern biology, the technical term for such a context-independent specification is *genotype*. By contrast, to characterise the organism in the form in which it actually appears – in terms of its outward morphology and behaviour as revealed within any particular environmental context – is to specify its *phenotype*. A fundamental premise of evolutionary theory, in its current neo-Darwinian guise, is that only the characteristics of the genotype, and not those of the phenotype, are carried across generations. On this principle rests the conventional division between ontogeny and phylogeny, or between development and evolution. Whereas development refers to the process whereby, in the life-history of the individual, the initial genotype is 'realised' in the concrete form of an environmentally
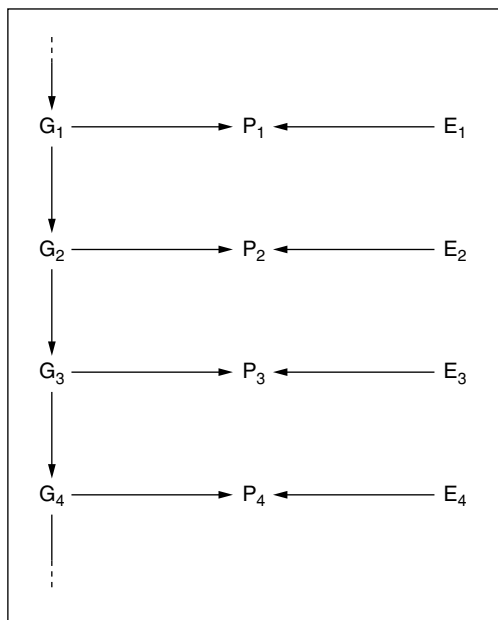
Figure 21.1 Schematic representation of the orthodox distinction between evolution and development. $G_1 - G_4$ are successive genotypes linked in an ancestor-descendant sequence. $P_1 - P_4$ are the respective phenotypes generated under environmental conditions $E_1 - E_4$. The vertical arrows depict an intergenerational phylogenetic pathway, the horizontal arrows depict ontogenetic processes confined within each generation.

specific phenotype, evolution refers to the gradual change, over a large number of successive generations, in the genotype itself (Figure 21.1). More exactly, it is the frequency of the constituent elements of the genotype, in populations of individuals, that is supposed to undergo evolutionary change, through a process of variation under natural selection.

To make this theory work, some vehicle is required that would serve to carry elements of the formal specification of the organism – namely genetic traits – from one site of development to another, heralding the initiation of a new life-cycle. With the discovery of DNA, it was thought that such a vehicle, long predicted, had at last been found. The DNA molecule comprises a very long string of nucleotide bases (some three billion in humans, contained within the twenty-three chromosomes of every cell in the body), each of which is one of only four possible kinds. This molecule has two critical properties. First, it binds with a complementary string which, rather like a photographic negative, provides a template in a chemical copying process that results in the synthesis of further strands of DNA with precisely the same sequence of bases as in the original. Secondly, segments of the molecule, of the order of ten thousand bases in length, guide the synthesis of specific proteins – the composition of each protein being determined by the linear sequence of bases in the corresponding segment. These proteins, in turn, are the fundamental constituents of the living organism. Thus the total complement of DNA in the cell, otherwise known as the genome, is supposed to encode in its base sequence a complete specification of the organism to which the cell belongs.

To explain this encoding, geneticists often resort to the language of information theory (Medawar 1967: 56–7). The genome, they say, carries a message which, roughly translated, means 'build an organism of such-and-such a kind' – that is, according to the formal specifications of the genotype. Now in fact, the theory of information, as it was developed in the 1940s by Norbert Wiener, John von Neumann and Claude Shannon, took up the notion of information in a specialised sense which had little to do with how the term was generally understood – namely to refer to the semantic content of messages passing between senders and recipients. Information for these theorists had no semantic value whatever; it did not *mean* anything. In their terms, a random string of letters could have the same informational content as a Shakespeare sonnet (Kay 1998: 507). This point, however, was entirely lost on the molecular biologists who, having realised that the DNA molecule could be regarded as a form of digital information in the technical, information-theoretic sense, immediately jumped to the conclusion that it therefore qualified as a *code* with a specific semantic content. The point was not lost on the information theorists themselves, however, who repeatedly warned against the conflation of the technical sense

of information with its generic counterpart, and looked on in dismay as the scriptural metaphors of message, language, text and so forth became entrenched in a biology that had become seemingly intoxicated with the idea of DNA as a 'book of life'.[3]

The upshot of this conflation was that the information theoretic model, as it came to be reincarnated in the context of biological science, was all about messages and their transmission. It is a requirement of the model, thus conceived, that the message to be transmitted be first broken down into its minimal constituents of meaning, each of which is then represented, in coded form, in an appropriate physical medium. In verbal communication, for example, concepts are said to be represented by distinctive combinations of sounds (in the case of

Figure 21.2 A schematic representation of the analogy between genes and words as signs.

speech) or graphic traces (in the case of writing). In this physical guise they are picked up by a receiver who, through a reverse process of decoding, recovers the original meanings and puts them together to reconstitute the message. In the case of genetic transmission, the minimal constituents of meaning were supposed to correspond to characters or traits, each represented by a DNA segment with a distinctive base sequence. Just as the linguistic sign is understood to unite a particular concept with a particular sound pattern, so the gene came to be conceived as the union of a particular trait with its corresponding segment of the DNA molecule (Figure 21.2).

I shall defer until later the question of whether this model of information transmission provides an adequate account of what goes on even in ordinary verbal discourse. Suffice it to say at this point that the model is premised upon an ontological separation of mind and world. Indeed this separation is intrinsic to the very notion of information in its original sense – to the idea that form is *brought in* to real-world contexts of interaction. The message or instruction to be conveyed is thus supposed to pre-exist in the mind of the sender, and to be translated into a physical medium by means of a set of encoding rules that are themselves entirely independent of the contexts in which it is sent and received. How a message, once received, will be interpreted may of course depend upon the situation, but the message itself must be unambiguously specified. Likewise, if we are to suppose that the genome is a carrier of coded information from one context of development to another, then the 'message' – that is, the genotypic specification – must pre-exist its representation in the DNA, and be linked to it by context-independent encoding rules. In other words, it must be possible to 'read off' each element of the genotype – each trait – from its corresponding DNA segment, regardless of local conditions of development. However, just as a received message may be interpreted differently in different circumstances, so also the genotype will be 'realised' in different ways depending upon the environmental context, leading to observed variations in phenotypic form (Figure 21.3).
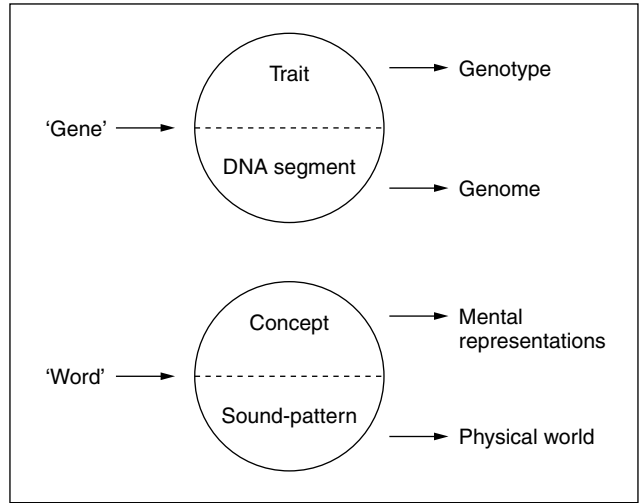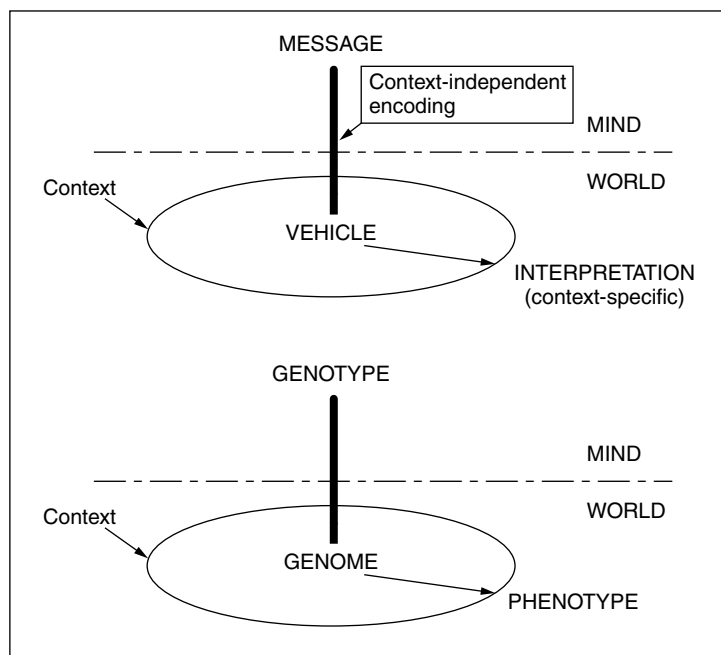
Figure 21.3 The relation between message, vehicle and interpretation (above), and its analogue in the biological domain (below).

The problem inherent in this kind of account may be posed in terms of a simple question: where is the genotype? Where, in other words, is the formal specification that – according to the model – is said to be imported with the genome into the inaugural context of a new life-cycle, as a 'biological endowment'? We may grant that the newly conceived organism comes into being with its complement of DNA; taken on its own, however, the DNA 'specifies' nothing. It is, after all, just a molecule, and a remarkably inert one at that. But in reality, DNA never exists on its own, except when artificially isolated in the laboratory. It exists within cells, which are the parts of organisms, themselves situated within wider environments. And it is only by virtue of their incorporation into the living machinery of the cell that molecules of DNA have the effects they do. They do not, unaided, make copies of themselves or construct proteins, let alone build entire organisms (see Lewontin 1992: 33, for an exceptionally lucid exposition of this point). Thus the DNA is not an agent but a reactant, and the particular reactions it sets in train depend upon the total organismic context in which it is situated. Only by presuming such a context can we ever say what any particular gene is 'for' (Ingold 1991: 368). To put it another way, it is the cellular machinery that 'reads' the DNA, and that reading is part and parcel of the very development of the organism in its environment. Hence there is no 'decoding' of the genome that is not itself a process of development; no attributes of form that do not themselves originate within that process; no specification of the organism that is independent of the developmental context.

So to return to my earlier question, 'where is the genotype?', there can be only one possible answer: 'in the mind of the biologist'. The genotype, I would argue, is the outcome of biologists' attempts to write a programme or algorithm for the development of the organism, in the form of a coherent system of epigenetic rules. These rules are derived by abstraction from the organism's observed characteristics, in a manner analogous to the way in which a linguist would derive the rules of syntax by abstraction from a sample of recorded utterances – an analogy that receives explicit acknowledgement in the notion of the 'biogram'. Moreover the same trick is then applied: as Bourdieu (1977: 96) puts it, by transferring onto the object of study the exteriority of the observer's relation to it, that object appears as the mere vehicle for an interiorised system of rational principles, a kind of 'intelligence' installed at the heart of the organism and directing its activity from within. Just as the linguist regards speaking as the application of syntactic structures located

inside speakers' heads, so the biologist regards the development and behaviour of the organism as having its generative source in an innate biogram. In both cases aspects of form, abstracted from the contexts in which they arise, are converted into the elements of a programme that is said to precede and govern the processes of their production. As an explanation for the genesis of form, the circularity of this argument needs no further elaboration.

Nothing better illustrates the transferral, onto the organism, of the principles of the observer's external relation to it, than the fate of the concept of biology itself. Referring initially to the procedures involved in the scientific study of organic forms, 'biology' has come to be seen as a framework of rational principles – literally a *bio-logos* – supposedly residing in the organisms themselves, and orchestrating their construction. For any particular organism, this bio-logos is, of course, its genotype. Herein, then, lies the explanation for the identification, noted above, of 'biology' with genetics. In the final analysis, this identification betrays a logocentrism that biology shares with the entire enterprise of Western natural science: the assumption that the manifest phenomena of the physical world are underwritten by the work of reason. But the reason that science sees at work there is its own, reflected in the mirror of nature.

FORM AND DEVELOPMENT

If organisms do not receive their form, with the genome, as a 'biological endowment', then how are we to explain the stability of form across generations? The answer lies in the observation that the life of any organism is inaugurated with far more than its complement of DNA. For one thing, as Lewontin points out, the DNA is contained within an egg which, even before fertilisation, is equipped through its own development with the essential prerequisites for launching future growth. 'We inherit not only genes made of DNA but an intricate structure of cellular machinery made up of proteins' (Lewontin 1992: 33). For another thing, that egg exists not in a vacuum but in an already structured environment. Life begins, then, with DNA, in an egg, in an environment. Or as Oyama succinctly puts it, 'what is quite literally passed on or made available in reproduction is a genome *and a segment of the world*' (1985: 43, my emphasis). Together, these constitute a developmental system, and it is in the dynamic functioning of this system – in the complex interactions among components both internal to the organism (including the genome) and beyond its boundaries – that form is generated and maintained (Ho 1991: 346–7).

It follows that no one component – such as the DNA – can be privileged as 'holding' the form, which the others 'bring out', since the form itself is an emergent property of the total system consisting in the relations between them. Change in any component of the system, whether in the genome or in some aspect of the intra- or extra-organismic environment, insofar as it alters the parameters of development, may bring about significant change in form; however the possibilities for change are not unlimited but are constrained within the range of forms that can be generated by the system's properties of dynamic organisation. Thus the explanation for the intergenerational stability of form is to be found not in the fidelity of DNA copying, but in the self-organising potentials of the entire field of relations within which development occurs (Goodwin 1988, see also Chapter Eighteen, pp. 345–6).

It is important to be precise about how this conclusion differs from what is generally accepted in evolutionary biology. The issue of whether organisms are determined by their

nature or their nurture, by innate endowment or environmental conditioning, has long been declared obsolete, having given way to an interactionist perspective according to which every organism, at any moment of its life-cycle, is the product of a complex and ongoing interplay between genetic and environmental factors. Naturally, it is argued, organisms take on different appearances in different environments. It is nevertheless assumed that these environmentally induced differences merely reveal the potential for variation of what is essentially the *same* organism, and that only those differences attributable to genetic modification attest to evolutionary change in the organism itself. And it is on precisely this assumption, with its implicit privileging of the genome as the true bearer of organic form, that the conventional distinctions between genotype and phenotype, and between evolution and development, have been allowed to rest.

For orthodox theory, these distinctions are quite critical. Evolution, as we have seen, is taken to refer to intergenerational changes in the genotype; development to the translation, within each generation, from genotype to phenotype (see Figure 21.1). This is not to say that these processes are thought to be unrelated. Thus it is recognised, on the one hand, that the circumstances of development – insofar as they have a bearing on genetic replication – may exert an influence on evolution, and on the other hand that it is the evolved genotype that establishes the schedule for development (Hinde 1991: 585). But the theory rules out any possibility that the life-history of the organism may itself form an intrinsic part of the evolutionary process. From an evolutionary perspective, it is not what organisms do but the reproductive consequences of their activity that are significant. Considerations of agency and intentionality have no place in evolutionary explanation: these are assigned to the proximate mechanisms involved in the realisation of strategies whose ultimate rationale is already established by natural selection. For this reason, it is customary to speak of organisms as the sites *where* evolution occurs, but not as agents of evolutionary change. Thus changes are said to take place *in*, but not to be brought about *by*, populations of organisms.

But if form, as I have argued here, is a property not of genes but of developmental systems, then to account for the evolution of form we need to understand how these systems are constituted and reconstituted over time. We have seen that what an organism initially receives from its predecessors includes, besides its complement of genetic material, the environment wherein this material is placed. This placement sets up specific relations that are enfolded in the developing form. Yet as it develops, the organism also contributes by way of its actions to the environmental conditions not just for its own further development but for the development of other organisms – of its own and of different kinds – to which it relates. It may do so either directly, insofar as it has an immediate presence in the other's environment, or indirectly, insofar as its actions sustain, modify or transform the environment of another's experience. For example, the human child may grow up surrounded by parents and siblings, in a house constructed long ago by predecessors whom she will never meet. Yet all these people, and doubtless many more besides, play or have played their part in establishing the conditions for that child's development. Conversely, as she grows older and her powers of agency expand, she in turn will contribute to the conditions of development for her own contemporaries and successors.

Speaking of human beings, it is usual to refer to this process, wherein the people of each generation furnish through their life-activities the contexts within which their successors grow to maturity, as *history*. My point, however, is that human history is but one part of a process that is going on throughout the organic world (see Ingold 1990: 224). In this process, organisms figure not as the passive products of a mechanism – variation

under natural selection – that stands outside of time and change, but as active and creative agents, producers as well as products of their own evolution (Ho 1991: 338). For every organism not only undergoes development within a wider field of relationships, but also contributes through its activity to the perpetuation and transformation of that field. Thus what it does, in its life, is not expended in the reproduction of its genes but is incorporated into the developmental potentials of its successors. There can, then, be no separation between ontogeny and phylogeny, development and evolution. Ontogenesis, far from being accessory to evolutionary change, is the very fount from which the evolutionary process unfolds.

To forestall any possible misunderstanding, let me be quite clear about what I am claiming. I do not deny the existence of the genome or its importance as a regulator of developmental processes. Nor do I deny that changes can and do occur in the composition of the genome, as a result of the mutation, recombination and differential replication of its constituent segments across generations. I *do* deny, however, that the genome contains a specification of the essential form of the organism, or of its capacities for action, and therefore that a record of genetic change is in any sense tantamount to an account of its evolution. Much genetic change occurs without any corollary on the level of form or behaviour; conversely, significant morphological or behavioural transformation may occur without any corresponding changes in the genome. We have seen that since organisms, in their activities, can modify the conditions of development for successor generations, developmental systems – and the capacities specified therein – can go on evolving without requiring any genetic change at all. Nowhere is this more evident than in the evolution of our own kind. In order to explain how change can occur in the absence of significant genetic modification, orthodox evolutionary theory has had to conceive of a 'second track', of culture history, superimposed upon the baseline of an evolved genotypic heritage. Once it is realised, however, that capacities are constituted within developmental systems, rather than carried with the genes as a biological endowment, we can begin to see how the dichotomies between biology and culture, and between evolution and history, can be dispensed with. This is a matter to which I now turn.

BIOLOGY AND CULTURE

Let me begin by returning to the comparison between walking and cycling. Bipedal locomotion, according to orthodox theory, is part of the human biological endowment – that is, it is included as a property of the 'anatomically modern' genotype. Now we have seen that the genotype is the product of biologists' attempts to attribute the capacities of the organism to an interior programme, consisting of a set of rules or algorithms capable of generating appropriate responses under any given environmental circumstances. Thus if the capacity to walk belongs with the genotype, then it must be possible to comprehend walking as the output of a programme of this kind, designed by natural selection and imported with the genome into diverse contexts of development. What, then, are we to make of the capacity to ride a bicycle? It is doubtful whether much could be learned about the origins and development of this capacity through an examination of changing gene frequencies in the cycling public! By common consent, it forms no part of the human genotype, and for that reason is not generally considered to have evolved in the biological sense. Yet clearly, cycling is a skill that, in some sense, is passed on from one generation to the next. It cannot therefore be ascribed to the phenotype, since phenotypic characters are not supposed to be transmitted across generations.
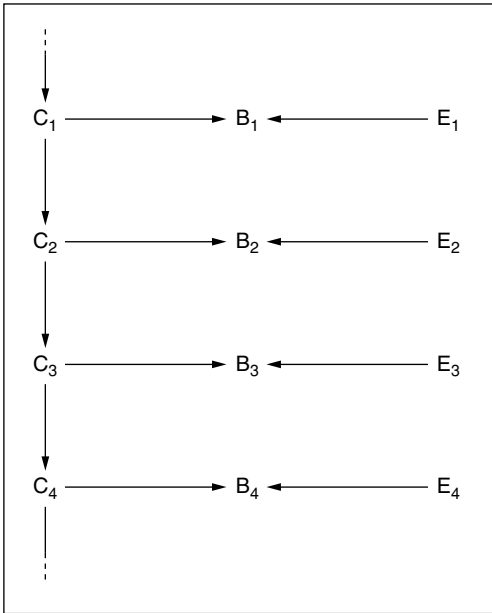
Figure 21.4 Individual and social learning. The vertical arrows depict the intergenerational transmission of cultural information through social learning in the ancestor-descendant sequence $C_1 - C_4$. The horizontal arrows depict the processes of individual learning through which, in each generation, the received cultural schemata are translated into overt behaviour ($B_1 - B_4$) under given environmental conditions ($E_1 - E_4$). Compare Figure 21.1.

To accommodate the kind of non-genetic transmission that is apparently at work here, it has often been proposed that in human populations, a second mode of inheritance operates in parallel with the genetic one. 'Human beings', as Durham puts it, 'are possessed of *two* major information systems, one genetic, one cultural' (1991: 9). The capacity to ride a bicycle, then, is included in a cultural analogue of the genotype – a 'culture-type' (Richerson and Boyd 1978: 128) – whose constituent elements or traits are likewise encoded in a symbolic medium. This model of enculturation rests on precisely the same assumptions that I have already spelled out in connection with genetic transmission. It presupposes that the cultural 'message' that the individual receives from its conspecifics pre-exists its symbolic representation, that the message can be 'read off' from the representation by means of context-independent decoding rules, and that this reading precedes the application of the received cultural knowledge in the settings of practice. Thus a clear distinction has to be drawn between the intergenerational transmission of cultural information and its expression in the career of each individual, exactly parallel to the distinction that orthodox theory in evolutionary biology draws between the transmission of the elements making up the genotype and the latter's realisation, within the life of every organism, in the guise of the phenotype. The former distinction has conventionally been made by means of a contrast between 'individual' and 'social' learning (Figure 21.4).

Individual learning, here, refers to the way in which behaviour, just as much as morphology, is 'acquired' through the environmental steering of development culminating in the mature phenotype. In this each organism learns for itself, through experience, and the process of learning is coterminous with its own lifespan. Social learning, on the other hand, refers to the transmission, across generations, of a body of cultural knowledge in the form of a tradition. This tradition consists not in behaviour itself, but in a system of schemata – 'plans, recipes, rules, instructions' (Geertz 1973: 44) – for generating it. In the case of bicycle riding, for example, what an individual acquires from his or her seniors are the elements of a programme, analogous to the genetically encoded programme that supposedly underwrites the skills of walking, which is then 'realised' through practice and experience in an environment. Notice how this division between the social and the individual components of learning effectively divorces the sphere of the learner's involvement with others from the contexts of his or her practical engagement in the world. It assumes that what is passed on, in learning, is a context-independent specification for behaviour, and that such a specification is available for transmission, in coded form, outside the situations of its application. Accordingly, the inter-generational stability of cultural form is seen to lie in the fidelity with which this information is copied from mind to mind.

As an account of what goes on in learning to ride a bicycle, or for that matter in the acquisition of any other practical skill, this is highly artificial. For one thing, the art of cycling – as indeed that of walking – defies codification in terms of any formal system of rules and representations. Even if it were possible to devise a programme for bicycle riding, it is doubtful whether a creature endowed with such a programme, and equipped with a machine to ride, would ever be able to achieve the fluency of the skilled practitioner. For another thing, where adult assistance is required it is above all to provide demonstration and support – that is, to set up situations in which the novice is afforded the possibility of getting the feel of things for him- or herself. The same is true in language learning, aptly described as a process of 'guided reinvention' (Lock 1980), in which the contribution of adults in the infant's environment is to provide contextually specific interpretations of the infant's vocal utterances that lead it to the discovery of how words can be used to convey meaning. What each generation contributes to the next, then, are not rules and schemata for the production of appropriate behaviour, but rather the specific conditions of development under which successors, growing up in a social world, acquire their own embodied skills and dispositions.

Words and deeds, of course, are full of meaning, and in any situation of learning the novice will listen to what people say and watch what they do. Yet there is no 'reading' of words or deeds that is not part of the novice's own practical orientation to his or her environment. Spoken words, for example, taken in themselves, are no more *for* anything than are genes. They do not carry meaning *into* contexts of interaction, as the orthodox model of information transmission requires. Rather, again like genes, they gather their meanings from the contexts of activities and relationships in which they are in play (I return to this point in Chapter Twenty-three, p. 409). Thus culture, as a body of context-independent, traditionally transmitted knowledge, encoded in words or other symbolic media, can exist nowhere except in the mind of the anthropological observer. It is derived by abstraction from observed behaviour, in just the same way that the biologist derives the genotype by abstraction from the observed characteristics of the organism, and the linguist derives a grammar from the record of utterances. And by the same trick that we have already noted in the fields of linguistics and biology, this abstraction is imagined to be implanted within the minds of the actors themselves, as the generative source of their behaviour.

I have argued, to the contrary, that whether our concern be with walking or cycling, talking or writing, making tools or operating machines, what people do cannot be understood as the behavioural output of an inner programme but only as the intentional activity of the whole human organism in its environment. Thus to reiterate my earlier conclusion, we have no grounds for distinguishing between those capacities for action due to 'biology' and those due to 'culture'. True, there are things that human beings can do which are apparently impossible for any other creature, even if raised in a human environment. And it is reasonable to suppose that these potentials would not have emerged were it not for certain changes in the genome that could, in principle, be traced in ancestral populations. But the genome, on its own, does not specify a capacity of any kind. Thus we will search in vain for a capacity for culture, whose evolutionary emergence might have marked what is sometimes called the 'human revolution'. For there is no such thing, apart from the diverse capacities of human beings growing up in different surroundings. These differences of developmental experience, as I have shown, are incorporated anatomically so as to make of each of us an organism of a different kind.

Evolution and history

Where does all this leave the Cro-Magnons? Did their arrival on the scene really mark the appearance of people 'entirely like ourselves'? We are not, of course, by any means perfect; nevertheless – Howells remarks – 'it is not unfair to say that *Homo sapiens* seems to have finished up all the unfinished business of human progress in the Pleistocene' (1967: 242). Yet in another sense, human progress had scarcely begun. These two senses of progress correspond, as we have seen, to what are customarily distinguished as evolution and history. Now this is not a distinction that would generally be made for any other species. It is assumed, in other words, that there can be no cumulative or progressive changes in the behavioural capacities of non-human kinds that are not tied to evolutionary changes in their essential, species-specific forms. For this reason, no-one finds it necessary to speak, for example, of 'anatomically modern chimpanzees' or 'anatomically modern elephants'. What the concept of anatomical modernity does, in effect, is to recognise an alternative sense in which people can be 'modern', only to place it out of bounds, as of no concern to the student of human biological evolution. Yet this second sense of modernity, founded as it is upon a commitment to the supremacy of reason, is built into the very project of contemporary science and underwrites its claim to be able to deliver an authoritative account of the workings of nature. Here, then, lies the contradiction to which I referred at the outset. For the historical process, which purports to raise humanity onto a level of existence above the purely biophysical, is presupposed by science as providing the platform from which its practitioners – who are of course humans too – can launch their declarations to the effect that the human is just another species of nature (Foley 1987).

The roots of the contradiction considerably antedate the rise of evolutionary theory in its modern Darwinian form, and may be traced back to a basic dualism in eighteenth-century thinking between nature and reason. In his *Systema Naturae* of 1735, Linnaeus recognised the status of man as a species within the animal kingdom, under the designation *Homo*. Yet unlike all other animal species, it was not by his physical characteristics that he was to be known. Indeed, Linnaeus declared himself hard-pressed to find *any* definitive criterion whereby human beings could be distinguished anatomically from the apes. Rather, he chose to identify the human distinction by means of a word of advice: *Nosce te ipsum* ('know for yourself'). It is in his wisdom, Linnaeus thought, not in his bodily form, that man differs essentially from the apes. Through our unique possession of the intellectual faculty of reason, we are the only beings who can seek to know, through our own powers of observation and analysis, what kinds of beings we are. There are no scientists among the animals.

The great nineteenth-century theorists of social and cultural evolution – men like Edward Tylor and Lewis Henry Morgan – placed their scenarios of human progress within a similarly dualistic framework. While all animal species were ranked, according to their physical form, in a chain of being culminating in humankind, the latter was supposed to have been uniquely endowed by the Creator with an incorporeal consciousness which, through history, has undergone progressive advance under laws of development of its own, within the bounds of an unchanging body (Ingold 1986b: 58–60). Thus all human beings were deemed to be alike in their essential nature and developmental potentials, but populations were supposed to differ in the degree to which these potentials were realised in the passage from savagery to civilisation. With the publication, in 1871, of Darwin's *The descent of man*, the doctrine of common human potential – or, as it was then known, of

the 'psychic unity of mankind' – was brought into contention, challenged by the view that inter-population differences on the scale of civilisation could be attributed to anatomical variation, above all in the size and complexity of the brain. Thomas Huxley went so far as to declare that the superiority of the European over the allegedly small-brained savage was no different, in principle, from that of the savage over the even smaller-brained ape. There ensued a period of quite rampant racism from which anthropology did not begin to recover until the second decade of the twentieth century. It did so by reasserting the universality of human nature, and by insisting that whatever differences of biological endowment may exist between populations are of no consequence for history and cultural development.

Indeed so long as it is assumed that the biological constitution of human organisms is given as a genetic endowment, there can be no escape from racism save by disconnecting cultural from biological variation. Clearly there is no foundation in fact for the raciological belief that cultural differences have a genetic basis. My point, however, is that in turning its back on racist dogma, subsequent theorising about human evolution has reconstituted the eighteenth-century view in all its essentials. Once again human beings figure in a dual capacity, on the one hand as a species of nature, on the other as creatures who – uniquely among animals – have achieved such emancipation from the world of nature as to make it the object of their consciousness. It is true that unlike Linnaeus, contemporary students of human evolution are able to point with some precision to a whole cluster of anatomical features by which human beings may be distinguished not only from extant, non-human primates but also from their pre-human, hominid forbears. These are the diagnostic features for the recognition of anatomical modernity. But humans of this recognisably 'modern' type did not evolve as scientists, let alone with a ready-made theory of evolution. Science and its theories are widely understood to be the products of a cultural or civilisational process quite separate from the process of biological evolution: a cumulative growth of knowledge that has left our basic natures unaffected.

We thus have two distinct continua, one evolutionary, leading from ancestral pongid and hominid forms to 'anatomically modern' *Homo sapiens sapiens*, the other historical, leading from our presumed hunter-gatherer past to modern science and civilisation (Ingold 1998: 89–93). And it is the intersection of these continua that sets up a point of origin, without parallel in the history of life, at which our ancestors stood on the threshold of culture and, for the first time, came face to face with meaning (Figure 21.5). This point is believed to mark the emergence of what is sometimes called 'true humanity' (see, for example, Botscharow 1990: 64), or the arrival, in Howells's words, of 'the new kind – our kind – of man' (1967: 242). This kind of man, equipped anatomically for life as a hunter-gatherer, was possessed of a mind that would eventually enable him to reason like a scientist. Cro-Magnon Man, it seems, had all the biological potential necessary to make him into a scientist: his brain was as big, and as complex, as Einstein's. But the time was not ripe, in his era, for this potential to be brought out. Stretched between the poles of nature and reason, epitomised respectively by the contrasting figures of the hunter-gatherer and the scientist, lies the entire history of human culture, a history that has unfolded within the parameters of an essentially stable bodily form. And that form, which all human beings are supposed to receive as a common biological endowment, irrespective of cultural or historical circumstance, is of course none other than the 'modern human' genotype.

Just as in the eighteenth-century doctrine of psychic unity, the human genotype – albeit installed by natural selection rather than divine intervention – is said to establish a universal baseline for cultural development. As an ideal representation of the essential form of
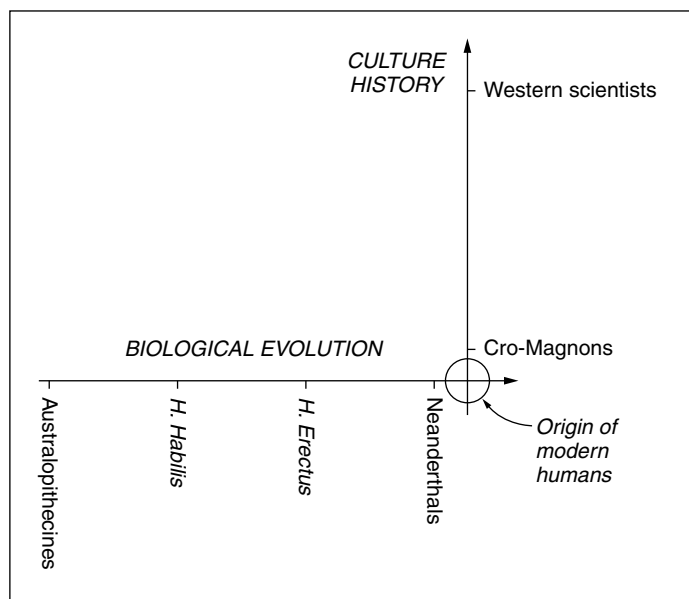
Figure 21.5 The origin of 'true humanity', conceived as lying at the intersection between the continuum of biological evolution leading from ancestral pongid and hominid forms to anatomically modern humans, and the continuum of culture history leading from Palaeolithic hunting and gathering to modern science and civilisation.

humanity, the 'modern human' is itself a creature of modern Western thought. He (or she) is conceived as the epitome of everything a human being possibly could be, a compendium of universal capacities abstracted from the manifold forms of life that have actually appeared in history, and retrojected onto the Palaeolithic past as a set of genetically inscribed, developmental potentials underwriting their realisation.[4] Thus the course of history reappears as the progressive unfolding of the latent capacities of our ancestors, biologically fixed in evolution even before history began. There is a certain irony here. Biologists, who long ago co-opted the notion of evolution to describe the process that Darwin had originally called 'descent with modification', have been scathing in their criticism of social scientists who have continued to use the notion, with reference to human history, in its original sense of progressive development. Yet just such a view of human history, as the developmental realisation of innate potentials, is implied by their own theory!

I have argued that the distinction between evolution and history, as set out in the orthodox view, cannot be sustained. Regarded as a process whereby people, in their activities, shape the contexts of development for their successors, history reappears as the continuation, by another name, of a process of evolution that is going on throughout the organic world. In the *Eighteenth Brumaire*, Marx wrote that 'men make their own history, but they do not make it just as they please, they do not make it under circumstances chosen by themselves, but under circumstances directly encountered, given and transmitted from the past' (Marx 1963 [1869]: 15). In just the same way do organisms in general make their own evolution. There is, then, no point of origin when history began; no moment of emergence of 'true humanity'. Thus we do not need one theory to explain how apes became human, and another to explain how (some) humans became scientists. For the business of human evolution was not finished with the arrival of the Cro-Magnons, but has carried on into the present – though we call it history now. I have attempted to show that the various forms and capacities that have emerged within this process are neither given in advance as a genetic endowment, nor transmitted as components of a separate body of cultural information, but are rather generated in and through the dynamic functioning of the developmental systems constituted by virtue of the involvement of human beings in their diverse environments.

For human as for any other organisms, such involvement is an inescapable condition of existence. I believe we need to recast the whole way we think about evolution, taking

this condition of involvement as our point of departure. Orthodox theory, which attributes evolutionary change to underlying modifications in the genotype, requires that human beings be completely specifiable, independently of the relational contexts of their development. But such a specification, as I have shown, exists only in the mind of the observer, and therefore introjects a division between mind and world, or between reason and nature, as an ontological *a priori*. There is, in truth, no species-specific, essential form of humanity, no way of saying what an 'anatomically modern human' *is* apart from the manifold ways in which humans actually *become* (Ingold 1991: 359). These variations of developmental circumstance, not of genetic inheritance, make us organisms of different kinds. Thus my conclusion, that the differences we call cultural are indeed biological, carries no racist connotations whatever. By refocusing on the human-being-in-its-environment, we can dispense with the need for a species-specific characterisation of humankind, and so also with the opposition between species and culture. People inhabit one world, not because their differences are underwritten by universals of human nature, but because they are caught up – along with other creatures – in a continuous field of relations, in the unfolding of which all difference is generated.

Speech, writing and the modern origins of 'language origins'

> As Horne Tooke, one of the founders of the noble science of philology, observes, language is an art, like brewing or baking; but writing would have been a better simile. It certainly is not a true instinct, for every language has to be learnt. It differs, however, widely from all ordinary arts, for man has an instinctive tendency to speak, as we see in the babble of our young children; whilst no child has an instinctive tendency to brew, bake or write.
>
> Charles Darwin, *The descent of man* (1871: 131)

THE LANGUAGE CAPACITY: ORIGINS OF AN ILLUSION

All theorising about the origins and evolution of language rests on a distinction that, by and large, is regarded as so obvious that it virtually goes without saying. It is that by 'language', in this context, is meant not any particular language, as spoken presently or in the past by members of some human community, but a *capacity* that is manifestly common to all human beings, and that is surely one of the hallmarks of our species. One could of course examine the changes over time that have given rise to the immense proliferation of languages spoken around the world, but that is a problem for philologists or historians of language. Does not the very possibility of this history, however, rest on the fact that all of us, including our ancestors up to a certain critical point, share (or shared) the capacity to speak? If so, then explaining how, when and why this capacity arose is a problem not of history but of evolution. The twin distinctions, between particular languages spoken and the capacity for language, and between history and evolution, do indeed seem intuitively reasonable. For my part, however, I am convinced that they are unsustainable, and in this chapter I shall try to show why.

I contend that there is no essence of language, no way of saying what language *is*, apart from the manifold ways in which people actually speak. But if there is no such thing as language *as such*, what is the point of seeking its origins? I do in fact take the view that it is futile to inquire into the origins of language, not for the reason that is usually offered – namely, that such inquiry calls for empirical evidence about the behaviour of our earliest ancestors that is simply not available – but because the very idea of an origin is a fiction that serves more to confer legitimacy on the present than to illuminate the past. I shall argue that Charles Darwin, and Horne Tooke before him, were right to compare language to an art like brewing or baking, though it might have been more appropriate to select different examples, such as singing, dancing or playing a musical instrument, which do not involve the procurement and processing of raw materials. But no more than these other arts did language evolve at some point, as a built-in property of the human

make-up. Rather, it inheres in the very practice of the art, in the activities of speaking themselves. These activities, in their unfolding, *constitute* a process of evolution. Thus there is, in reality, no point of origin, since the evolutionary process continues even as we speak.

Although my thesis as regards the question of origin is a negative one, I would not want what I have to say to be construed in an entirely negative light. It may make no sense to seek the point where language began, but it makes a good deal of sense to inquire into the evolution of speech. To do this, however, it will be necessary to drop two assumptions that lie at the heart of most contemporary theorising on the subject. First, we must cease to regard speech as the derivative output of something else – that is, 'language' – which is supposed to pre-exist as a generative potential or capacity independently of human activity in the world. And secondly, we must not assume that what evolves is some kind of context-independent specification of the essential form of humanity.

Closely bound up with the argument I have just introduced is another one, about the relation between speech and writing. Reflecting on the parallel between language and other practical arts, Darwin came to the conclusion that the latter could be better compared to writing than to speech, and that spoken language was – after all – a rather special case. I propose to argue, somewhat to the contrary, that language looks special to us only because we view it from a perspective that has been conditioned through our familiarity with certain practices of writing. I contend that these practices have had a decisive impact in shaping our modern view of language as an objective system of rules and meanings – as something that people *have*, and can *use*. According to my argument, it is only thanks to the reification of speech which writing makes possible, that the idea of language as a thing, and hence of language origins, becomes even conceivable. If language, in a certain formal sense, is a consequence of writing, then to seek the evolutionary origins of language in this same sense, as a precondition for writing, is manifestly circular.[1]

I shall conclude, however, by suggesting that besides considering the effects of writing on our view of what language is, we need to attend to the possible bias in our view of what *writing* is, a bias that stems from the frequently asserted notion that writing is a technology of the word. It is not, then, writing *per se*, but rather a *technologised* conception of writing, associated with the rise of modern print literacy, that leads to the objectification of speech as language, and thence to the problematic of language origins.

The standard model: genetic bases of cultural transmission

That, stripped to its bare essentials, is what I have to say. In what follows I shall elaborate on, and seek to demonstrate, the various claims I have made. I begin, however, by returning to what I shall henceforth call the 'standard model' of the relation between language as a universal human capacity, and the manifold languages of particular communities. This holds that the former is a product of evolution under natural selection, and is transmitted genetically, thereby establishing the cognitive foundations, in successive generations, for the acquisition of the latter through a parallel process of cultural transmission.

I have summarised the standard model in Figure 22.1, and shall devote a few moments to spelling out three of its key features. The first is that every particular language may be fully described as a system of acquired rules and representations – comprising its syntax and lexicon – inscribed in the minds of its speakers and transmissible as a body of information, from one generation to the next, independently of its instantiation in those acts
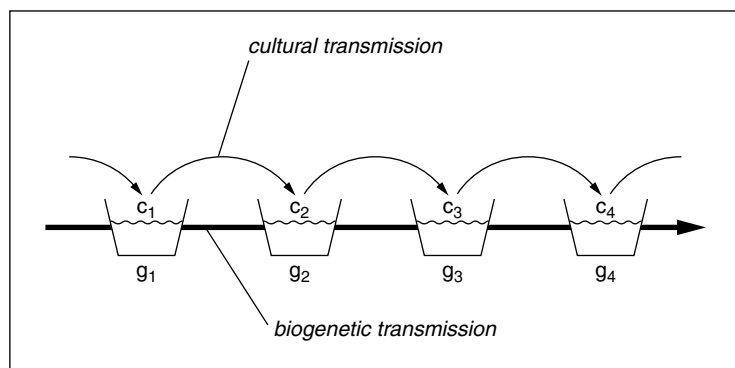
Figure 22.1 The orthodox view of the relation between biogenetic and cultural transmission. The letters g_{1-4} refer to the genetic specifications, in successive generations, of an innate acquisition device; the letters c_{1-4} refer to the content, again in successive generations, of acquired culture.

of speaking and listening for which it is prerequisite. The second is that this transmission is possible only thanks to the presence, in the mind of each and every human being, of a ready-made acquisition device that allows the novice to derive the specifications of his or her language from the input of otherwise unintelligible speech sounds. And the third is that the relation between the acquisition device and the acquired information is one of container to content. The novice starts life with a certain capacity already in place, which is then gradually filled up with the informational content upon which his or her linguistic competence is based.

Now I believe that in each of these respects the standard model is wrong. Let me begin with the second. It is perfectly true that *if* the essence of linguistic competence lies in acquired rules and representations, then the mind must be pre-equipped with cognitive devices of some kind that allow the relevant information to be reconstructed through a processing of the raw input of sensory data. Consider, for example, the following definition of learning, from one of the leading exponents of cognitive science, Philip Johnson-Laird. Learning, he writes, amounts to 'the construction of new programs out of elements of experience'. But if you need programmes to *process* the data of experience, how can they be constructed *from* such data? There is only one possible answer, and that is by means of programmes that are already in place. Thus, if you are to learn anything, you must be pre-equipped with a programme governing the construction process. Perhaps this latter programme was constructed in the same way, through the processing of experiential input according to yet another programme. 'You can learn to learn', Johnson-Laird continues, 'but then that learning would depend on another program, and so on. Ultimately, learning must depend on *innate* programs that make programs' (Johnson-Laird 1988: 133, my emphasis).

Following this line of reasoning, what applies to learning in general must also apply to language acquisition in particular. Maybe there are rules or algorithms governing the acquisition of language that are themselves acquired. But then there must be processing devices in place that make possible *their* construction in the mind of the learner. So where do these come from? Whence comes the information that specifies the construction of the *innate* devices, without which no learning would be possible at all?

By and large, in the literature of cognitive science, the postulation of innate structures is taken to require no more justification than vague references to genetics and natural selection. It is assumed that the problem of where they come from has already been solved, at least in general terms, by evolutionary biology. Unfortunately this is not the case. For one thing, most biologists claim that they have long since discarded the distinction between innate and acquired structures. According to what is often called the 'first law of biology',

the actual characteristics of organisms are neither innate nor acquired, but are products of the interaction, throughout the life cycle, between endogenous, genetic causes and exogenous, environmental ones. Thus interactionism has long since replaced innatism as the dominant creed within biological science. In fact, however, a doctrine of genetic preformation still lurks beneath the surface of orthodox interactionism, since it is built into biology's own master theory – the theory of evolution under natural selection. To see how this is so, we need to focus on the account that is offered, within the framework of Darwinian evolutionary biology, of the process of ontogenetic development. This calls for a brief detour into the realms of biological theory.

THE EVOLUTION OF FORM: GENOTYPES AND DEVELOPMENTAL SYSTEMS

Interactionism describes development as an unfolding relation between genes and environment. In this relation, however, it is the genes that are supposed to hold the essence of form, whereas the environment is conceived merely to furnish the material conditions for its realisation. Each gene is taken to represent a unit of pure, digital information, encoded in the molecular structure of DNA. Put together, these units make up a formal specification of the organism-to-be (the genotype) which, by definition, is given independently and in advance of any real-world context of development. At the commencement of every new life-cycle, this genotypic specification is introduced, by way of the DNA of the germ cells, into a particular environmental context. In development, the information carried in the genes is then said to be outwardly expressed in the phenotypic form of the resultant organism. But whereas the elements of the genotype are transmitted across generations, the characteristics of the phenotype are not. Over many generations within a population, through accidents of mutation and recombination coupled with the effects of differential reproduction, the informational content of the genotype changes. These changes, it is claimed, add up to a process of evolution.

   This is all very neat, save for one problem. To be sure, every organism starts life with its complement of DNA. But if genes are to be understood, as the theory requires, as the carriers of a formal design specification, shaped up through natural selection, from one locus of development to another, then there must be some systematic correspondence between the elements of this specification and the actual DNA of the genome that is *independent* of any developmental process. Such a correspondence has been generally assumed, but has never been demonstrated (see Cohen and Stewart 1994: 293–4). What happens in practice, as I showed in the last chapter (pp. 382–3), is that biologists seek to redescribe the observed phenotypic characteristics of organisms as the outputs of a formal system of epigenetic rules. These are then 'read in' to the genome, so that development can be seen as the 'reading off' of a programme or specification that is already there, and that is imported with the genome into the site of inauguration of a new life-cycle. In short, as an account of the evolution of form, Darwinian theory rests on a simple circularity. That is one reason, of course, why it has proved so hard to refute.

   At root, the issue comes down to one about copying. The orthodox account has it that the formal design features of the incipient organism are copied along with the DNA, in advance of its interaction with the environment, so that they can then 'interact' with the environment to produce the organism. I would argue to the contrary, and as illustrated schematically in Figure 22.2, that copying is itself a process that goes on within the context of organism-environment interaction. In other words, the 'missing link' between the
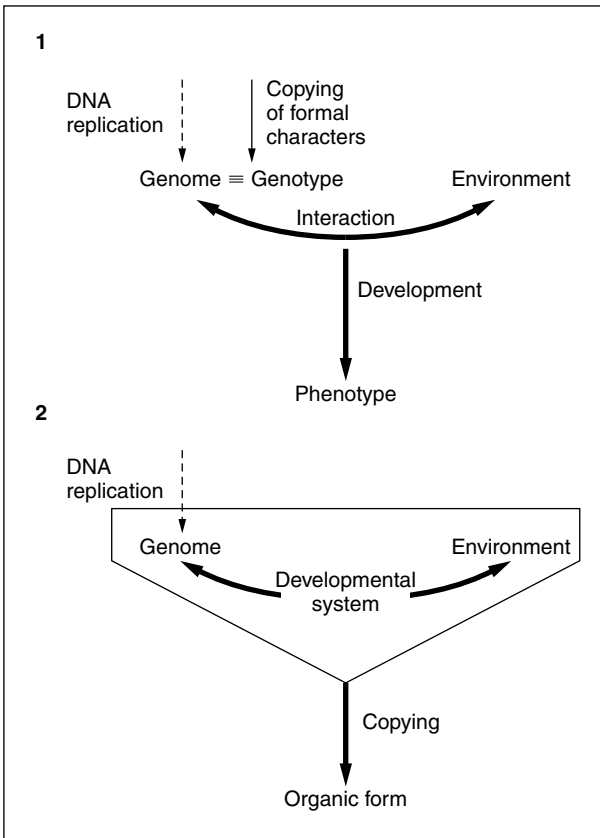
Figure 22.2 Two theories of copying: (1) in the orthodox, Darwinian account, a design for the organism is copied with the DNA of the genome, which is then 'brought out' in the course of development within an environmental context; (2) in the 'developmental systems approach' proposed here, the process of copying is equivalent to that of the organism's development in its environment.

genome and the formal characteristics of the organism is none other than the developmental process itself. There is, then, no design for the organism, no genotype – except, of course, as this might be constructed by the observing biologist. Organic form, in short, is *generated*, not expressed, in development, and arises as an emergent property of the total system of relations set up by virtue of the presence of the organism in its environment. Hence the evolution of form, as Susan Oyama has put it, is tantamount to 'the derivational history of developmental systems' (Oyama 1989: 5).

THE ARCHITECTURE OF THE MIND: ITS CONSTRUCTION AND FURNISHING

Let me now return to the question I left hanging a moment ago. From where are we to conjure up the innate devices that are supposed to make possible the acquisition of language? It is generally assumed that having been fashioned by natural selection, these devices must have a genetic basis. Thus the information that specifies their construction must form one component of the human genotype. Yet here, psycholinguistics runs into the very same dilemma that, as we have seen, derails Darwinian theory – in an even more acute form. It is more acute because the cognitive devices in question must already exist, not merely in the virtual guise of a design, but in the concrete hardwiring of human brains. Somehow or other, in order to kick-start the process of ontogenetic development, strands of DNA have miraculously to transform themselves into information processing mechanisms. This is rather like supposing that merely by replicating the design of an aircraft, whether on the drawing board or on the computer screen, one is all prepared for take-off.

Attempts in the literature to resolve this problem, insofar as it is even recognised, are confused and contradictory. To cut a rather long and tangled story short, they boil down to two distinct claims. One is that the concrete mechanisms making up what has been called the 'evolved architecture' of the human mind are reliably constructed under all normal environmental circumstances. The other is that these universal mechanisms proceed to work on 'variable environmental inputs' to produce the diversity of manifest competencies and behaviours that we actually observe (Tooby and Cosmides 1992: 45).

Let me unpack these claims, illustrated schematically in Figure 22.3, with specific reference to language acquisition. Here the alleged universal mechanism is the 'language acquisition device' (LAD). During a well-defined stage of infancy, this device is said to be activated, operating upon the input of speech sounds from the environment so as to establish, in the infant's mind, the grammar and lexicon of the particular language (or languages) spoken in his or her community. An infant reared in social isolation, and thus deprived of relevant environmental input, would not learn a language, but would still possess a fully formed LAD. It would thus appear that language acquisition is a two-stage process: in the first, the LAD is constructed; in the second it is furnished with specific syntactic and semantic content. That, at least, is the theory, but is it borne out in practice? Is there any basis in reality for separating out the construction of innate psychological mechanisms from the transmission of acquired cultural information, as shown in Figure 22.4, or is the division into these two stages merely an artefact of our own analytic procedures? In what follows, I shall argue that the latter is the case.

THE MYTH OF THE LANGUAGE ACQUISITION DEVICE

The first point to note is that the mechanisms (if we can call them that) underwriting the child's ability to speak

Figure 22.3 Two claims for the construction of mind, following the model presented by Tooby and Cosmides (1992). (1) A universal building design (one component of the genotype) interacts with the environment to 'reliably construct' the 'evolved architecture' consisting of a number of cognitive mechanisms including, for example, the 'language acquisition device'. (2) The architecture (presumed universal) interacts selectively with the environment, accepting information specifying diverse cultural competencies such as, for example, the ability to speak English, Japanese or Swahili.

are not constructed in a vacuum, but rather emerge in the context of his or her sensory involvement in a richly structured environment. Recent research has shown that from well before birth, infants are sensitive to the surrounding ambience of sound, and above all to the mother's voice (De Casper and Spence 1986). Thus the human baby comes into the world already attuned to certain environmentally specific sound patterns. From birth onwards, it is surrounded by an entourage of speakers who provide support in the form both of contextually grounded interpretations of the infant's vocal utterances and of demonstrations, or 'attention-directing gestures' (Zukow-Goldring 1997: 221–3), to accompany their own. This environment, then, is not a source of variable input for pre-constructed mechanisms, but rather furnishes the variable conditions for the self-assembly, in the course of early development, of the mechanisms themselves. And as the conditions

Figure 22.4 Putting the two claims of Figure 22.3 together yields a two-stage model of cognitive development. Note, however, that this model depends on factoring out those features of the environment that are constant, or 'reliably present' in every conceivable developmental context, from those that represent a source of 'variable input' from one context to another. Only the former are relevant in the first stage (the construction of innate mechanisms such as the 'language acquisition device'); only the latter are relevant in the second (the acquisition of specific cultural competencies such as the ability to speak a particular language or languages).

vary, so the resulting mechanisms will take manifold forms, each differentially tuned both to specific sound patterns and to other features of local contexts of utterance. These variably attuned mechanisms, and the competencies they establish, are of course the neurophysiological correlates of what appear to us observers as the diverse languages of the world.

In short, language – in the sense of the child's capacity to speak in the manner of his or her community – *is not acquired*. Rather, it is an ability that is continually being generated and regenerated in the developmental contexts of children's involvement in worlds of speech (Lock 1980).[2] And if language is not acquired, then there can be no such thing as an innate language acquisition device (Dent 1990).

This conclusion puts paid to the last of the three features of the standard model that I outlined earlier: that learning a language is like filling a universal, genetically specified container with particular cultural content. Of course, people raised in different environments learn to speak in different ways. But these differences, far from being received into the prefabricated compartments of a universal psychology, are immanent in those very fields of relations wherein human beings undergo the organic processes of growth and maturation, and in which their powers of speech are developed and sustained. Bearing this in mind, we can now return to the first feature of the standard model, that each particular language is transmissible as a corpus of context-independent rules and representations from one generation to the next. This cannot be true, for the simple reason

that it rests, as we have seen, on the impossible precondition of a ready-made cognitive architecture. For the theory of language learning as information transmission to work, lengths of DNA would have magically to transform themselves into concrete brain mechanisms, ready and prepared to process relevant environmental input. In reality, as Dent has pointed out (1990: 694), there can be no mechanisms in advance of experience, since no matter at what point in development the mechanisms are identified, the individual at that point already has a history of interaction with the environment.

Lest this argument be misunderstood, let me emphasise that my purpose in questioning the real existence of innate mechanisms is not to argue for the priority of nurture over nature, or to substitute for innatism a doctrine of the environmental determination of human capacities. These are not the only theoretical alternatives, and indeed both are fallacious for the same reason, most succinctly expressed by Oyama, namely that the information specifying the capacities in question – whether its source be supposed to lie inside the organism or outside in the environment – must be presumed to 'pre-exist the processes that give rise to it' (Oyama 1985: 13). My point is that these capacities are neither internally prespecified nor externally imposed, but arise within processes of development, as properties of dynamic self-organisation of the total field of relationships in which a person's life unfolds.

WRITING, PRINT LITERACY AND THE MODERN CONCEPTION OF LANGUAGE

What is the source of the peculiar conception of language enshrined in the standard model? Consider the following three implications of the notion that language is fully describable as an objective system of rules and representations for generating well-formed and meaningful utterances. First, every verbal composition must exist initially as an entity in its own right – a mental construction – independently of the contexts of its enunciation and interpretation in the real world of other persons and relationships. Secondly, performance is a matter of placing this composition 'on line' for mechanical execution by the physical apparatus of the body. Thirdly, the particular qualities of performance – such as tone of voice, facial expression, and so on – may be considered superfluous to linguistic competence and therefore disregarded.

Now in ordinary speech, these conditions *never* obtain, although linguists often write as though they do. That is to say, in real life verbal composition is inseparable from performance, and performance is an intentional and finely nuanced activity that draws its meaning from the situational contexts of its enactment. In modern literate societies, however, there is one domain of activity where the conditions outlined above *approximately* obtain – and this is the activity of writing. There is a sense in which the written verbal composition does exist as an entity in its own right, moreover with modern print technology the writing itself does seem like the mechanical replication of a preconstructed design, while words printed on paper are, in themselves, expressionless, and are silent to the work and feeling that went into their production.

Thus we are brought at length to writing, or more precisely to the rise of modern print literacy, as the source of the conception of language that underpins what I have called the standard model. It would be no exaggeration to claim, with Roy Harris (1980: 6), that no other historical development has had such a profound impact on the concept of what a language is. It is from systems of writing, as David Olson has convincingly shown, that the concepts and categories have been drawn for thinking about the structure of

spoken language, rather than the other way around. Moreover it is our experience of reading written texts that leads us to regard the spoken utterance as 'composed of words related by means of a syntax' (Olson 1994: 68–78). As units of linguistic analysis, the phoneme, the word and the sentence are all artefacts of writing that, far from being intrinsic to speech, have latterly been imposed upon it (Coulmas 1989: 39).[3] In most modern, literate societies, grammarians and lexicographers have worked hard to rationalise and standardise the forms of speech so as to bring them into line with these artificial, scribal conventions, setting up canons of correctness against which actual utterances may be judged more or less well-formed, and which citizens are encouraged (or sometimes forced) to emulate. In these societies, language has become an institution.

It is hardly surprising, then, that linguists working from within this institutional context imagine that in learning, language is copied into the minds of practitioners in much the same way that, in their own analyses, it is reproduced on the printed page. It is this scriptist bias that leads many linguists naïvely to assume that the 'languages' of non-literate communities exist, each complete with grammar and lexicon, implanted in the unconscious minds of their speakers, simply waiting to be discovered and written down. The idea, however, that writing is simply the transcription of speech – or that, in the words of Jonathan Rée, 'everything that is linguistic must in principle be writable as well' (1999: 320) – is an illusion. For what is not writable, and therefore lost in the transcription, is everything that gives the spoken utterance its 'illocutionary force' (Austin 1962: 100), that is its power to launch intentions and produce effects, including intonation, voice quality, accompanying manual or facial gesture, and so on. Much of the history of literacy may be understood as a struggle to compensate for this limitation, largely through an elaboration of the lexicon to convey subtleties of intention and interpretation that are normally expressed non-lexically in speech (Olson 1994: 109–10). Thus in its rendering as the output of a language that is fully writable, speech is not so much transcribed as transformed.

Such is the power of writing on the way we both conceive and practice speech that it takes quite an effort of imagination to think ourselves back into the condition of what Walter Ong (1982) calls 'primary orality', in which speech had the power to move people, as song does still, by virtue of its immediate impact on the senses. To get a perspective on this, we could do worse than adopt the advice of Giambattista Vico, offered in his *New Science* of 1725. For a genuine understanding of the origins of civilisation, Vico wrote, 'we must reckon as if there were no books in the world' (1948 §330). That, presumably, was the state of affairs in prehistory. How, says Vico, can we have a theory of the origins of civilisation in prehistory if our very concept of civilisation presupposes the existence of the book? How likewise, we could ask, can we have a theory of language origins whose very notion of what language is presupposes print literacy? As John Shotter puts it, commenting on Vico's counsel, 'if we are to grasp the nature of the beginnings of language, and reckon as if there were no books in the world, . . . we must grasp the nature of a form of communication which does not consist in a sequential occurrence of events or things, nor in a series of products or of component meanings, but which rather "subsists" in the continuous flow of sensuous, "moving" activity between people' (Shotter 1991: 385).

IF SPEAKING IS A SKILL, IS WRITING A TECHNOLOGY?

This is the point at which to return to my initial claim that speaking is akin to the practice of an art like singing or dancing. I do not mean art in its modern sense, a sense that has come to be opposed to technology as the spontaneous creation of novelty to the mechanical replication of pre-existing design (see Chapter Nineteen, pp. 349–50). I have in mind, rather, the traditional meaning of art as *skill*, of the kind we associate with craftsmanship – a sense preserved in such words as 'artisan' and 'artefact'.

Before proceeding further, it is necessary to reiterate three general points about skill. I have already introduced and discussed these points at length in Chapter Nineteen (pp. 352–4), and will summarise them only briefly here. First, skills are not techniques of the body considered, objectively and in isolation, as an instrument in the service of culture. They are rather properties of the whole system of relations constituted by the presence of the practitioner in his or her environment. Secondly, skilled practice is not just the mechanical application of external force but is continually responsive both to changing environmental conditions and to the nuances of the practitioner's relation to the material as the task unfolds. Thirdly, skills are refractory to codification in the programmatic form of rules and representations. Thus it is not through the transmission of any such programmes that skills are learned, but rather through a mixture of improvisation and imitation in the settings of practice. Now all these points, which apply to skills in general, also apply to speaking in particular. Speaking is not a discharge of representations in the mind but an achievement of the whole organism-person in an environment; it is closely attuned and continually responsive to the gestures of others, and speakers are forever improvising on the basis of past practice in their efforts to make themselves understood in a world which is never quite the same from one moment to the next.

What, then, of the difference between speaking and writing? Earlier, I drew attention to certain properties of writing, specifically of the kind associated with modern print literacy, that may be responsible for the conception of language enshrined in the standard model. These properties – that writing divorces the author from the immediate context of sensuous engagement with his or her surroundings, that it involves the more or less mechanical execution of a preconceived verbal composition, and that it is fully analysable in terms of an objective system of rules and representations – are the precise opposites of the three general properties of skill outlined above. Viewed in these terms, it would seem that the key difference between speaking and writing is that the latter is not a skilled practice at all, not an art in that sense, but the operation of a *technology*.

The idea of writing as a technology of language enjoys widespread currency in the literature (Sampson 1985: 17, Coulmas 1989: 9–11). A leading proponent of the idea has been Walter Ong. One of the things that makes writing technological, according to Ong, is that it involves the use of tools and other equipment (Ong 1982: 81). For us the tool that immediately comes to mind is, of course the pen or pencil, or perhaps the typewriter. But it is worth remembering, in passing, that the writer's equipment may involve far more than that. For example the tools of the medieval English scribe, according to Michael Clanchy, included: a knife or razor for scraping parchment, a pumice for smoothing it, a boar's tooth for polishing the surface, a ruler, plumbline and awl for ruling the lines, and, for the writing itself, quill pens and a penknife, inkhorn and inks of various colours. This is not to mention the furniture, lamp-lighting and other paraphernalia of the study (Clanchy 1979: 116). Where writing is pressed on wet clay, as in Sumerian cuneiform, or engraved in stone, stamped on metal or embroidered in tapestry, the tools would have

been quite different, and often of a kind that we would not immediately associate with writing at all. My concern, however, is not with what kinds of tools are used, or even with whether tools are necessarily used at all (think of writing in the air, or with a finger in the sand), but whether the use of tools in writing is tantamount to operating a technology.

Ong thinks it is, and to demonstrate his point he invites us to compare writing with playing the violin. The violinist, in Ong's characterisation, is an operative whose task is to induce vibrations in the strings of her instrument, according to its principles of acoustic functioning, in order to render a pre-prepared musical composition in the concrete medium of sound. Let me cite the relevant passage in full:

> A violin is an instrument, which is to say a tool. An organ is a huge machine, with sources of power . . . totally outside its operator . . . What do you think the sounds of an organ come out of? Or the sounds of a violin or even a whistle? The fact is that by using a mechanical contrivance, a violinist or an organist can express something poignantly human that cannot be expressed without the mechanical contrivance. To achieve such expression of course the violinist or organist has to have interiorized the technology, made the tool or machine a second nature, a psychological part of himself or herself.
>
> (Ong 1982: 83)

Just as the violinist has to interiorise a technology, Ong goes on to argue, so also must the writer, in order to be able to use his tools to inscribe linguistic forms upon a material surface.

Now whatever one may think of the organ, to describe the violin as a 'mechanical contrivance' seems a little odd, and certainly contrary to the experience of any practising musician. It is evident that in this passage, Ong has fallen prey to the fallacy, already discussed in Chapter Sixteen, that where tools or instruments are being used there must exist a technology (p. 316). For what the concept of technology does, as we have seen, is to recast the skilled activity of artisans as the behavioural or mechanical output of a formal system of rules and principles, a *logos* of *tekhnē*, that is embodied in the construction of the tools of the trade, and that practitioners are bound to put into effect, regardless of their personal experience and sensibilities. There is far more to playing the violin, however, than the mechanical execution of a pre-prepared series of instructions. And if there is a certain analogy between violin-playing and writing, it must point to a conclusion that is the very converse of the one that Ong draws from it: namely, that the activity of the writer, like that of the violinist, is an *art in itself*.

THE ART OF WRITING

To learn to play the violin, the novice has to practise with her instrument, over and over again, and often from a young age while her body is still rapidly growing, until her movements and the sounds that flow from them gain the fluency and responsiveness of the accomplished performer. Precisely the same is true, as we saw in Chapter Nineteen (pp. 356–7), of learning to make string bags in Central New Guinea. And in just the same way, too, the young apprentice scribe learns the craft of writing. This is not a matter, as Ong would have it, of interiorising a technology, but rather one of developing a skill. As with any skill, the art of handwriting emerges through a continuous process of bodily

modification within the contexts of novices' engagement with other persons and diverse objects in their environments. That writing is not merely added on, as a cultural supplement, to a body that is naturally ready-made for speech is apparent as soon as we pause to consider the demands, both postural and gestural, that it places on the developing human organism.

The postures routinely adopted in writing are in fact very variable, depending in part on tools, raw materials and furniture, and in part on status etiquette. For example the postural change adopted by Sumerian scribes when they started writing on large rectangular clay tablets rather than small square ones was probably responsible for the 90° rotation of all the originally pictographic signs of the cuneiform script (Powell 1981, Coulmas 1989: 74–5). Ancient Egyptian scribes adopted a variety of positions from cross-legged or kneeling to standing upright. Japanese and Chinese calligraphers knelt on the floor with the paper spread before them, while the Medieval European scribe settled into a solid wooden chair with a table or desk to support his work. Despite his relative immobility, however, he considered his writing to be an act of endurance 'in which', as one scribe mournfully wrote, 'the whole body labours' (Clanchy 1979: 116). And at least one contemporary professor of linguistics would agree. It is no more true, observes Roy Harris, to say that writing consists simply in the movements of the hand in holding a pen (or other instrument) than it is to say that speech consists only in the movements of the vocal tract. For 'we speak and write with our whole body', including the head, eyes, facial musculature, hands, arms, and general posture (Harris 1980: 99).

Jack Goody has characterised writing as a 'technology of the intellect' (1977: 151), but from the examples cited above it would seem equally appropriate to follow the lead of Marcel Mauss (1979 [1934]), and regard it as a technique of the body. For the regular practice of writing, like that of any other skill, leaves an indelible anatomical impression, whether in the visible form of the scholar's rounded shoulders or in the normally invisible architecture of the brain. Writing, as Paul Connerton has observed, is an *incorporating* as well as an *inscribing* practice: that is, it has an 'irreducible bodily component', not just in the controlled movement of the hand but in the way in which the hand together with the tool it holds is brought into a certain angular relation with the surface of the material to be inscribed, which in turn affects the writer's entire comportment (Connerton 1989: 76–7). Without diminishing the importance of the inscriptional aspect of writing, we should not forget that there can be no inscription without incorporation – without, in other words, the building of habitual patterns of posture and gesture into the bodily *modus operandi* of the skilled practitioner. Just like speech, in short, writing is an achievement of the whole human organism-person in his or her environment.

To view writing as an art is to think of it, in the first place, as a kind of dextrous movement, and to think of the text (recalling a distinction introduced in Chapter Eighteen (pp. 346–8)) as something woven rather than made. That is to say, the patterning or weave of the text emerges as the crystallisation of this movement, and is not prefigured as a mental construction which the writing hand merely serves to transcribe onto a surface. This is what André Leroi-Gourhan had in mind when he referred to prehistoric inscriptions as instances of 'graphism', whose meaning was drawn from contexts of oral narrative now irretrievably lost. Graphism, as Leroi-Gourhan insisted, is not representational but the congelation, as an enduring trace, of those rhythmic bodily movements that are intrinsic to preliterate speech (Leroi-Gourhan 1993: 190). Regarded as an instance of graphism, writing, just like mapping (see Chapter Thirteen, pp. 231–5), is *in*scriptive, not *trans*criptive. Indeed the idea that its forms and patterns are woven into the surface rather than

impressed upon it is supported by the derivation of the word 'text' from the Latin *texere*, meaning 'to weave' (Carruthers 1990: 12). Comparably, the word for writing among the Quiché Maya of Guatemala (*tz'ib*) comes from the stem *-tz'iba*, which refers to actions involving 'the creation of designs by means of weaving' (Tedlock and Tedlock 1985: 124–6).

In sum, far from being conceived as the operation of a technology, writing would be better understood as a graphic counterpart to speech. Since we speak, to recall Harris's point, with the whole body, and not just with the voice, the relation between speech and writing is not so much between a sonic reality and its visual representation as it is between the communicative bodily gesture and its graphic inscription.

HISTORY AS AN EVOLUTIONARY PROCESS: THE ILLUSION OF ORIGINS

With this point I return, at length, to Darwin, and to his idea that writing is comparable to brewing or baking, conceived as a skilled practical activity rather than a technology to be applied. Now for Darwin, it will be recalled, writing differed from speaking only insofar as it is not grounded, as is speaking, in an 'instinctive tendency'. In the last chapter, however, I set out to demonstrate that speaking is no more or less 'instinctive' than writing. As varieties of skilled practice, both speaking and writing emerge quite naturally in the course of development, so long as the necessary support structure or 'scaffolding' is present in the environment. Now if, as I have suggested, writing is an inscriptive counterpart to speech, it must follow that any account of the evolution of speech, in the sense I have proposed here, must at one and the same time be an account of the evolution of writing. Hence, contrary to conventional wisdom (Sampson 1985: 13, Coulmas 1989: 3), speech and writing are not separated on opposite sides of a dichotomy between human biological evolution and the history of technology, but are mutually implicated in a single evolutionary process.

It is this dichotomy between evolution and history, as I showed in the last chapter, that sets up a point of origin at their intersection. This is where scholars have conventionally placed the genesis of language, art, technology, religion, and all the other capacities that are supposed to mark our distinctive humanity. Yet not only has the conception of language enshrined in this origin story been profoundly influenced by writing, but also our conception of writing has been equally profoundly shaped by the idea of technology. It is, I suggest, the inherent 'logocentrism' of modern Western thought, its understanding of practice as rule-governed execution, that renders writing as a technological system. Hence it is this, too, and not writing *per se*, that is ultimately responsible for the reification of speech as language, and thus for the establishment of the whole problematic of language origins. To that extent, the problematic itself has its origins in modernity. I have argued here, to the contrary, that there is no point at which language could be said to have originated. For language exists only in the activities of speaking and writing themselves. These activities, and the skills in which they are based, emerge through what Harvey Whitehouse (1996: 113) has aptly called 'the labours of maturation', within fields of practice constituted by the activities of predecessors. And as each generation, through its activities, contributes to the conditions of maturation of the next, they continue to evolve.

It is, to conclude, fundamentally wrong to populate the past with people like ourselves, equipped with the capacities or potentials to do everything we do today, such that history becomes nothing more than the teleological process of their progressive realisation. The notion of an origin, defined as the point at which these capacities became established,

awaiting their historical fulfilment, is part of an elaborate ideological justification for the present order of things and, as such, an aspect of the pervasive presentism of modern thought. I have shown that the capacity to speak (or write) is inseparable from the capacity to speak (or write) in this way or that. We would not say, I think, that all human beings have evolved with the innate capacity to play musical instruments, and that this is distinct from the capacity to play the violin, the trumpet or the oboe. Likewise, it makes no sense to distinguish a universal capacity for language or speech from the ability to speak English, Japanese or Swahili. Speech is a dynamic phenomenon, and its forms change through history. As it does so, capacities evolve. They are still evolving. Language has not originated yet, and it never will.

The poetics of tool use

From technology, language and intelligence to craft, song and imagination

INTRODUCTION

In recent years, neo-Darwinian biology, cognitive science and psycholinguists have conspired to produce an extremely powerful approach to understanding the relations, in human evolution, between technology, language and intelligence. It is argued that linguistic and intellectual capacities, common to all human beings, are built-in properties of a mind whose basic architecture has evolved through a process of variation under natural selection. Remaining issues for debate concern whether the selective pressures guiding the evolution of these capacities lay in the social domain of the relations among conspecifics or in the technical domain of adaptation to the non-human environment, and whether – or at what point in either ontogeny or phylogeny – technical capacities are dissociated from linguistic ones. What is the difference, it is asked, between the kinds of mental constructional tasks involved in toolmaking and tool-using, on the one hand, and speaking, on the other? To what extent does the performance of these tasks call upon similar or even identical neurophysiological mechanisms?

As a social anthropologist, perched precariously on a narrow ledge while buffeted by contrary winds from the humanities and the natural sciences, I view these debates with increasing unease. I am disturbed by their apparent disregard of the intellectual ferment that has accompanied the contemporary critique of modernism, by the commitment of those involved to a version of 'normal science' that brooks no challenge to fundamental paradigmatic assumptions, and by their readiness to frame their various, competing accounts – of the entire career of humanity from earliest origins to the present day – in terms of concepts that, like the disciplines to which they belong, are recent products of a very specific history in the Western world. These concepts, as we have already seen (Chapter Sixteen, p. 312), are grounded in a general claim to the supremacy of human reason – a claim that is perhaps the defining feature of the discourse of modernity. Thus intelligence is the faculty of reason, language its vehicle, and technology the means by which a rational understanding of the external world is turned to account for human benefit.

I would like to propose a radically alternative claim: namely, that there is no such thing as technology, or language, or intelligence, at least in pre-modern or non-Western societies. By that I do not for one moment mean to suggest that people in such societies do not make common use of tools in their everyday activities, that they do not engage with one another in the verbal idioms of speech, or that these and other activities do not represent creative ways of coping in the world. My concern is rather to focus attention on what it means to say that everyday tool-using is a behavioural instantiation of technology, or that spoken

dialogue is the instantiation of language, or that creative activity is the instantiation of intelligence. Even in our own society, in which these propositions form a part of received wisdom, they are not immediately or obviously borne out in experience.[1]

For example, I am presently writing with a pen, I am wearing spectacles which help me to see, I carry on my wrist a watch which tells me the time, a chair and table provide supports respectively for my body and my work, and I am surrounded by innumerable other bits and pieces that come in handy for one thing and another. I incorporate these diverse objects into the current of my activity without attending to them *as such*: I concentrate on my writing, not the pen; I see the time, not my watch. Indeed it could be said that these and other instruments become truly available to me, as things I can use without difficulty or interruption, at the point at which they effectively vanish as objects of my attention. And if anything links them together, it is only that they are brought into the same current, that of my work. Drawing an explicit parallel with tool-use, Wittgenstein made much the same point about the use of words in speech (1953, §11): different words have different uses, just as do the pen, watch and spectacles; one normally attends not to the words themselves but to what the speaker is telling us with them, and they are bound together solely by virtue of the fact that the various situations of use are all embedded within a total pattern of verbal and non-verbal activity, a form of life.

There are, then, words, and activities that people do with words (i.e. speaking). And there are tools, and activities that people do with tools (i.e. tool-using). But is there language? Or technology? What is entailed in the assumption that for people to speak they must first 'have' language, or for people to use tools they must first 'have' technology – or indeed for people to engage in intelligent activities of any kind they must first 'have' intelligence? If, on the other hand, we drop the assumption, what further need do we have of these concepts? Suppose, to pursue my alternative claim, that we set ourselves the task of examining the relation, in human evolution, not between technology, language and intelligence, but between craftsmanship, song and imagination. The resulting account, I suspect, would be very different. Without prejudging the issue of which is the better conceptual frame, I shall attempt in what follows to indicate where some of the differences might lie. I begin with language and song.

Language, music and song

In the voice, human beings are equipped with a wonderfully expressive and versatile instrument. We use it to speak, and we use it to sing. But how, if at all, can we distinguish speaking from singing? In the modern conception the answer is simple: speaking is essentially linguistic, singing is essentially musical. Of course, speech may be present *in* the song, in the words that accompany the music – thus the song may be conceived as it is written on paper, in two registers proceeding in parallel: the musical sequence written as a series of notes, and the linguistic sequence as a concurrent series of words. So what is the difference between these two sequences, between the melodic line and the syntagmatic chain? One possible answer, to which I have already alluded in Chapter Fourteen (pp. 247–8), is that the former is immanent in the stream of sound, whereas the latter lies in some sense *behind* the sound. To listen to music is to dwell in a world of sound, which permeates our entire awareness. When we listen to speech, however, it is as though our awareness reaches through the sound to a world of words beyond – a world that is as silent as the book, where there are no sounds as such but only *images* of sound. What happens, then, when we listen to song?

'When words and music come together in song', writes Susanne Langer, 'music swallows words' (1953: 152). Her point is that the sounds of speech, to the extent that they are incorporated into a total musical phenomenon, cease to draw the listener's attention to meanings beyond themselves – meanings that, in speech, the sounds had served only to convey or deliver up to the listener rather than actually to embody. For Langer, sound that does not convey meaning in this sense is no longer *verbal* sound. Thus what essentially distinguishes verbal sound is that its significance can be extracted from the sound itself. Musical sound, by contrast, delineates its own meaning: it is meaningful not because of what it represents, but simply because of its affective *presence* in the listener's environment. If this were so, then speech is what you would be left with if you took the music out of song, and music is what you would be left with if the verbal component of song were swallowed up in its entirety, while poetry lies ambiguously, somewhere in between: more verbal than song, and yet more musical than speech. Thus in poetry we stretch words beyond the limits of normal utterance so that, in their sounding, they become expressive in themselves.

The very idea of a 'coming together' of words and music, however, presupposes their original separation. To produce a song, it seems, we have to *combine* two things that are initially distinct, music and language. But on what grounds do we assume this distinction? Could we not, equally well, put the argument in reverse, and suggest that music and language, as separate symbolic registers, are the products of a movement of analytic *decomposition* of what was once an indivisible expressive totality, namely song? To support such a reverse argument, we would need to be able to demonstrate that the difference between speech and melodic gesture is one of degree rather than kind, that to speak is indeed – in a sense – to sing, and hence that no absolute line can be drawn between them.[2]

The issue here largely hinges on the question of how words acquire meaning. The orthodox view has it that words refer to concepts. And concepts are the building blocks of comprehensive mental representations. At once there is presupposed a division between a subject, in whose mind these representations are to be found, and an objective world 'out there'. Meaning is in the mind, not in the world – it is *assigned* to the world by the subject. As I move around physically in the world, and advance through time, I carry my concepts with me – rather as I might carry a map in navigating the landscape (see Chapter Thirteen pp. 223–4). In different times and places I experience different sensations, but like the map, the system of concepts which organizes these sensations into meaningful patterns remains the same, regardless of where I stand. But if the world exists for me only as I have thus constructed it from the data of perception, how can it be shared? How can subjects inhabit a common world of meaning?

Again, the orthodox account argues that meanings are shared through verbal communication. Thus, my pre-prepared thought or belief has to be 'encoded' in words, which are then 'sent' in the medium of sound, writing or gesture to a recipient who, having performed a reverse operation of decoding, finishes up with the original thought successfully transplanted into his mind. Of course every act of communication takes place in a context, involving a particular speaker and a particular listener (or listeners) in a given environmental setting. But since words refer to abstract concepts rather than real-world objects, the relation of signification (between word and concept) is itself context-independent. The logic of this account therefore entails that signs can achieve the status of words, that is they become properly 'linguistic', only at the end point of a process of decontextualisation. At this point, the sign severs all connection with the external world, such that the relation between sign and meaning is wholly interior to the subject.

Not only must this relation of signification be context-free, it must also be conventional. Agreement on the conventional meanings of words is clearly a condition for the faithful transcription of ideas from one mind to another, according to the model of communication presented above. Such conventions, moreover, are presumed to be arbitrary – again on the grounds of the severing of iconic links between verbal signs and the properties of the exterior world. Linguists are fond of reminding us, naïve speakers all, that one word is as good as another for signifying the same concept, so long as the pattern of phonemic contrast that serves to set each word off from each and every other in the language is retained. To me it may seem that a quality of hardness is presented in the very utterance of the word 'hard', just as it is presented in a passage of music played staccato. And likewise, the word 'smooth' *sounds* smooth, as does the same passage played legato. But that, says the linguist, is an illusion born of the frequent association, in experience, of words and their 'real-world' denotata. To clinch the argument, he points to the sheer diversity of natural languages, to the fact that the different words – say – for 'dog', in these different languages, may bear not the slightest resemblance to one another, nor indeed to the real-world animal of that name.

Perhaps it is time for naïve speakers to put linguists in their place. For what the former can provide, which the latter cannot, is the perspective of a being who, quite unlike the dislocated, closed-in subject confronting an external reality, is wholly immersed, from the start, in the relational context of dwelling in a world. For such a being, this world is already laden with significance: meaning inheres in the *relations* between the dweller and the constituents of the dwelt-in world. And to the extent that people dwell in the same world, and are caught up together in the same currents of activity, they can share in the same meanings. Such communion of experience, the awareness of living in a common world of meaningful relations, establishes a foundational level of sociality which exists – in Pierre Bourdieu's (1977: 2) phrase – 'on the hither side of words and concepts', and that constitutes the baseline on which all attempts at verbal communication must subsequently build. For although it is indisputable that verbal conventions are deployed in speech, *such conventions do not come ready made*. They are forever being built up over time, through a cumulative history of past usage: each is a hard-won product of the hazardous efforts of generations of predecessors to make themselves understood. When we speak of the conventional meaning of a word, that history is simply presupposed or, as it were, 'put in brackets', taken as read. And so we are inclined to think of use as founded on convention when, in reality, convention can only be established and held in place through use. Thus to understand how words acquire meaning we have to place them back into that original current of sociality, into the specific contexts of activities and relations in which they are used and to which they contribute. We then realize that, far from deriving their meanings from their attachment to mental concepts which are imposed upon a meaningless world of entities and events 'out there', *words gather their meanings from the relational properties of the world itself*. Every word is a compressed and compacted history.[3]

Armed with this 'dwelling perspective', how should we view the difference between the spoken word and the musical gesture? It is no longer possible to argue that the former carries a conventional meaning that can be detached from the sound whereas the latter embodies its meaning in itself. We should rather argue that in words, the process of sedimentation and compression of past usage which contributes to the determination of their current sense has advanced to an exceedingly high degree, whereas in melody it is still incipient. But this is a difference of degree rather than kind, one that has perhaps been stretched to its maximal extent in the West by virtue of a cultural emphasis on the novelty

of music as against the conventionality of language. One cannot expect the difference to be everywhere, and at all times, to be so clearcut. For all music, viewed in this light, is on its way to becoming speech, and there is no Rubicon beyond which we can say that it is unequivocally one thing rather than the other. Conversely, all speech has its origins in vocal music, that is in song. As Merleau-Ponty put it, once we put speech back into the current of intercourse from which it necessarily springs, 'it would then be found that the words, vowels and phonemes are so many ways of "singing" the world' (1962: 187) – not, it should be stressed, in the naïve sense of producing an onomatopoeic resemblance between particular sounds and particular aspects of the world, but in the sense of entering intentionally and expressively into it, of 'living' it.

EMOTION AND REASON

The decomposition of song into the two 'compartments' of language and music has come about, I believe, through the assimilation of vocal gesture to a particular view of the human constitution, one that has long held a central place in Western thought, and that reached its apotheosis in the rationalism of Descartes. According to this view, every human being is a composite creature made up of body and mind, susceptible, on the one hand, to emotions and feelings (bodily sensations), but capable, on the other, of rational deliberation (mental operations). Thus the musical phrase is envisaged as a feeling shaped in sound, the verbal utterance as the representation of a thought. One is visceral, the other cerebral; one is experienced directly, the other presupposes a mental processing of received sound to extract the 'message'. In music (and more obviously still in dance) the body *resonates* with the world, in language one mind *communicates* with another. Music, assumed to be devoid of propositional content, is placed on the 'purely expressive' side of human existence; language is placed on the 'purely rational' side – all expressive aspects of speech being removed from language itself and assigned to contingent aspects of performance. Moreover, the rational is normally ranked above the expressive, as an index of 'higher' cognitive faculties that enable their possessors to step outside the world and – from this decentred vantage point – to take a cool, dispassionate view of it.

Such, of course, is the professed aim of natural science. Since the ascendancy of reason over emotion is implicated in science's claim to deliver an objective account of the natural world, it comes as no surprise to find the same principle of ranking at the basis of scientific accounts of the evolution of language – for it is surely language that enables humans to be scientists. Early formulations of the gestural theory of language origins, for example, rested on claims that the vocalisations of non-human primates (and by imputation, those of early hominids) were purely emotional or affective, and were therefore unlikely candidates as precursors for linguistic communication, whose key property was taken to be the conveyance of propositional information. Neurophysiologists, for their part, claimed to find empirical proof of the existence of a dichotomy between volitional and emotional behaviours and body movements, and proceeded to map these onto different regions of the brain (Myers 1976). Language was unequivocally ascribed to the former category of behaviour: thus Ronald Myers could assert that 'the use of words in verbal communications is clearly volitional'. What, then, are we to make of those words that are uttered without deliberate, prior intent? Myers is at least dimly aware of the problem. He continues:

> The existence of a second type of use of the voice, i.e. in emotional expression, remains uncertain, and its neurology poorly defined. Indeed the neurologist, when confronted

with the proposition of an emotional use of the voice, inevitably thinks of curse words or interjections.

(1976: 746)

The implication is that what are rather primly called 'curse words' do not really merit inclusion within the domain of language at all! Language proper comes to be marked out, through the exclusion of all vocal expression of emotion, as a realm of propositional statements delivered completely free from emotional or affective overtones. Gordon Hewes suggests an example: 'The message "the house is on fire" can, if need be, be conveyed with no more excitement than the information that Paris is a city in France' (Hewes 1976: 490).

This may be so. Yet in practice, anyone who says 'the house is on fire' does so in a context, and in a tone of voice that may vary from a level monotone to a high-pitched shout. In the context of utterance the former tone is as expressive of indifference as is the latter of urgency or anguish, and each is liable to evoke a quite different response on the part of the audience, from a detached contemplation of the conflagration to a rush to evacuate the building. How, then, can these possibly be regarded as alternative renderings of the same proposition? Only by abstracting the verbal phrase from its context, by treating it as though – like words printed, as they appear here, on paper – it had a separate existence of its own. In reality, regardless of whether I utter the words with excitement or indifference, or of whether or not I have already rehearsed my speech beforehand in thought, my speaking is an intentional act which can only artificially be broken down into propositional and expressive components. And the same, of course, goes for the utterance of a swearword, which may indeed be no more premeditated than my cry, 'the house is on fire', but which nevertheless launches my intention into the world and carries it forward towards its goal.

In short, whether I speak, swear, shout, cry or sing, I do so with feeling, but feeling – as the tactile metaphor implies – is a mode of active and responsive engagement in the world, it is not a passive, interior reaction of the organism to external disturbance (see Chapter One, pp. 23–4). We 'feel' each other's presence in verbal discourse as the craftsman feels, with his tools, the material on which he works; and as with the craftsman's handling of tools, so is our handling of words sensitive to the nuances of our relationships with the felt environment. Thus, far from characterising mutually exclusive categories of behaviour – namely 'volitional' and 'emotional' – intentionality and feeling are two sides of the same coin, that of our practical involvement in the dwelt-in world. Only by imagining the human organism to be an isolated, preconstituted entity, given in advance of its external relations, do we come to regard feeling as an inner, affective state that is 'triggered' by incoming sensations. And by the same token, we are led to recover the intentional (or 'volitional') character of speech by supposing that what makes it so is that it does *not* arise in reaction to external stimulus but is rather caused by an internal mental representation – by a thought, belief or proposition pressing to make itself heard (Chomsky 1968: 10–11).

What, then, is language? Or more precisely, how do we come to have the idea that such a thing as language exists, and that it therefore has an evolution that we can attempt to describe and explain? One answer might be that the idea is a by-product of the process of 'interiorisation' of personhood that has marked the emergence of the modern Western concept of the individual (Mauss 1985, Dumont 1986). It is this concept that leads us to look within the human being, rather than to the sphere of its involvement in a wider field of relations, to discover the ultimate, generative source of purposive action. Thus

every individual, as we saw in the last chapter, is supposed to come independently equipped with a 'built-in' language capacity (or at least a device for its acquisition), located somewhere inside the brain, which is the generative source of speech. Another possible answer, related to the first, is that the idea of language is necessarily entailed by a rationalism that is unable to conceive of action except as the mechanical replication, in a physical medium, of assemblies already constructed in thought. To language, then, is accorded the responsibility for constructing those assemblies, namely sentences, which are merely *executed* in speech. Yet a third answer might be that the idea of language is a 'fetish of linguists' (Goodman 1971: 34) who have sought to model the activities of speaking as the application of a coherent system of syntactic and semantic rules, derived by abstraction from observed behaviour. To be able to do this, they have to stand back from the current of discourse, focusing on speech *as* speech whilst the rest of us concentrate on what other people are telling us *in* their speech. But they have gone on to transfer, onto the speakers themselves, their own external relationship to the object of study, imagining the abstractions derived from this 'view from the outside' to be implanted within the speakers' minds and to constitute the essence of their competence. Hence, speaking is seen to consist in the implementation of linguistic rules. Inside the head of every speaker there appears a miniature linguist.[4]

Irrespective of which of the three answers presented above we might favour, the idea of language is a relatively recent one in the annals of human history. Yet it has had a profound impact, not only on the way we interpret our own activities of speaking, but also on those activities themselves. I have already shown, in the previous chapter, how the explicit codification of lexical conventions and grammatical rules sets standards of correctness which may – to varying degrees – be emulated or enforced. This institutionalisation of language is reflected in systems of education. Children not only learn to speak, as they have always and everywhere done, through immersion in an environment of vocally accomplished caregivers, they also receive formal schooling in the principles of language, as formulated by those appointed by society to act as its guardians – the grammarians and dictionary-makers. Above all, they are taught *to write*. The influence of writing on modern ideas and practices of language cannot be overestimated (Harris 1980: 6). For writing is not simply the equivalent of speech in an alternative medium. It is rather a kind of reconstructed, *as if* speech: as if the verbal utterance were fully amenable to systematic analysis in terms of syntactical rules; as if the tone of voice and pronunciation were entirely dispensable to meaning; as if the utterance had an autonomous existence, independently of the context of its production.

None of these things are actually true of speech, except perhaps for some kinds of 'reading aloud'. Yet modern linguistics has operated largely on the assumption that they are. Thus it turns out that the prototypical instance of the linguistic utterance, a rule-governed, context-independent proposition delivered without expression or affect, is that artefact so familiar to us but unknown to non-literate societies: the sentence of writing. Every theory of language evolution that holds up this prototype as its point of culmination, as the exemplar of a fully evolved language capacity, has an inbuilt 'scriptist' bias, treating speech that emulates or imitates writing as more perfect than speech that does not, and regarding the latter's deviations from the ideal as imperfections or errors. It is no wonder that in modern society, where the practices of speech have come to be modelled on writing and where speakers are taught to observe a rationalised system of rules and conventions (that is, to apply language), it has fallen to a specialised branch of verbal craft, namely poetry, to attempt to make up for the resulting expressive and aesthetic

impoverishment by producing forms which – whilst approaching the rhythmic and tonal patterns of music – are lexically and syntactically aberrant. But as Alfred Gell has argued, in a brilliant analysis of the vocal artistry of the Umeda, a society of Papua New Guinea, for a non-literate people whose speech has retained its expressive, song-like quality, un-expurgated by the rationalizations of the language-makers, all speaking is inherently poetic. 'What need of poets then?' (Gell 1979: 61).[5]

TECHNOLOGY, ART AND CRAFTSMANSHIP

I have argued that song, far from being put together from separate linguistic and musical components, is rather an expressive unity that is decomposed into these components through the imposition of a concept of language of recent, Western origin. Exactly the same argument can be made for the kind of skilled, technical artistry that I denote by the term 'craftsmanship'. For the concept of technology recasts the technical skills of the craftsman in terms of an objective system of rational principles, a *logos*, in just the same way that the idea of language recasts the verbal art of speaking in terms of the rules of grammar (see Chapter Fifteen, pp. 294–5). And as practice comes to be seen as the mechanical application of technological rules, so its expressive, aesthetic aspects are consigned to a separate domain of 'art' – a concept once synonymous with technical skill but whose meaning is now constituted by its *opposition* to technology on precisely the same grounds that music, in the modern conception, is constituted by its opposition to language (see Chapter Nineteen, pp. 349–51).

In a technologically literate society, tool-using is assimilated to the operation of artificial systems, much as speaking is assimilated to writing. Hence the prototypical tool appears as the mechanical gadget which embodies in its own construction the principles of its operation. As an antidote to the scriptist bias of formal linguistics, I have suggested (following Merleau-Ponty) that we regard speech as a species of song. To follow up this suggestion into the analogous field of tool-use, I propose that we consider, as a prototypical instance, the kind of tool-using that comes closest of all to song – that is, playing a musical instrument. For if to speak is to sing, then surely to use a tool is to play. Since, as every anthropologist knows, it is helpful to be able to draw on first-hand experience, I shall consider the example of playing the 'cello. As a reasonably proficient 'cellist, my experience is that when I sit down to play everything falls naturally into place – the bow in my hand, the body of the instrument between my knees – so that I can launch myself directly, and with the whole of my being, into the music. I dive in, like a swimmer into water, and lose myself in the surrounding ambience of sound.

This is not to say that I cease to be aware, or that my playing becomes simply mechanical or automatic: quite the contrary, I experience a heightened sense of awareness, but that awareness is not *of* my playing, it *is* my playing. Just as with speech or song, the performance embodies both intentionality and feeling. But the intention is carried forward in the activity itself, it does not consist in an internal mental representation formed in advance and lined up for instrumentally assisted, bodily execution. And the feeling, likewise, is not an index of some inner, emotional state, for it inheres in my very gestures, in the pressure of my bow against the strings, in the vibrato of my left hand. In short, to play is itself to feel, so that in playing, I put feeling *into* the music. It makes no more sense, then, to split off a rational-technical component from the (residually) expressive component of playing a musical instrument than it does to split off a propositional component from the expressive component of speech or song.

I do not claim, of course, that all of what I have described above happens spontaneously, without preparation or rehearsal. A great deal of practice is required, and there are puzzles to be solved. To get around awkward passages, complex configurations of fingering and hand position have to be worked out in advance, and bowing movements have to be planned so that at the end of one phrase the bow is in the right place on the strings for the beginning of the next. At such times, as also when something goes wrong in the performance, one becomes painfully aware both of oneself and of the instrument, and of the distance that separates them. The instrument is felt to be obdurate or resistant; it sticks. My point, however, is that this opposition between player and instrument is collapsed in the instant when the former begins actually to *play*. In that instant, the boundaries between the player, the instrument and the acoustic environment appear to dissolve.

Lest my choice of example may seem to force the issue – for in playing a musical instrument one does not achieve any direct, practical effect beyond the rapidly fading tapestry of sound – let me suggest another instance of tool-use, again drawn from my own experience, this time of anthropological fieldwork among reindeer herdsmen in northern Finland. The tool I have in mind is the lasso, and the herdsman uses it to capture selected deer from the throng of animals circulating in the round-up enclosure (Ingold 1993b). In construction, the lasso is extremely simple: no more than a length of rope with a sliding toggle. When not in use it hangs limply in a coil from the hand, or trails loose on the ground. Yet in the moment of being cast, it assumes the lively form of a flying noose, a form which never stands still even for a single instant. Like the musical phrase shaped in sound, the form hangs suspended in the current of action. Thus, working a lasso, like playing a musical instrument, is pure movement or flow, and everything that I have said applies to the latter applies to the former as well. It involves an embodied skill, acquired through much practice. It carries forward an intention, but at the same time is continually responsive to an ever-changing situation. Just as, with the orchestral 'cellist, the processes of his visual attention to the conductor and his manual handling of the instrument are indissociable aspects of one ongoing process of action, so also the herdsman's handling of the lasso is inseparable from his attention to the movements of the herd in the enclosure. The attentive quality of the action is equivalent to what, in relation to musical performance, I have called 'feeling': to play is to feel; to act is to attend. The agent's attention, in other words, is fully absorbed in the action. Yet things can go wrong in the roundup, as they can in performance: the lasso can miss its mark, ropes can become entangled, the efforts of other herdsmen working in the enclosure may be disrupted, animals can even be injured. The frustrated herdsman then becomes an object of embarrassed self-regard, not to mention abuse from his fellows (I speak from experience). The flow is broken, and one has to begin all over again.

COGNITION AND PRACTICE

So much for the view of the naïve, yet reasonably skilled practitioner. Enter now the cognitive scientist, who claims that where tools are used, there must be a technology – a theory of how the tools are to be operated – lodged, albeit unbeknown to its possessors, inside their heads. The claim is, of course, parallel to that of the linguist who assumes that the 'languages' of non-literate peoples exist fully-formed in the minds of speakers, merely awaiting explicit formulation. One wonders, then, what such a *logos* of 'cello-playing or lasso-throwing would look like. It would consist, presumably, in a set of formal

rules or algorithms capable of combining elementary motor schemata into complex, patterned sequences which, precisely executed, should produce instrumental gestures appropriate to any given context. The task of representing the technique of 'cello-playing or lasso-throwing in such formal terms would likely be an infinite one, but even supposing it were possible, would an imaginary creature, programmed with this knowledge, and provided with the requisite material equipment, be able to function remotely like a skilled practitioner?

The answer, I believe, is that it would not. It would produce, rather, a sort of 'as if' action, as if what in reality is a continuous flow could be reconstructed in the form of countless steps, each the mechanical execution of a pre-established plan or assembly – analogous to the sentence of language (Bourdieu 1977: 73, Ingold 1986b: 209–10). It is as though the quality of attention that, as we have seen, inheres in the skilled practitioner's conduct were to be withdrawn from the conduct itself and concentrated in the operation of a mental constructional device (an 'intelligence'), which, on the basis of a processing of sensory inputs, is supposed to generate plans and place them 'on line' for execution. Thus thought becomes active, action passive. In essence, the 'as if' actor and the skilled practitioner employ different kinds of intentionality. The first is the kind entailed in orthodox Cartesian accounts of volitional behaviour, in which to have an intention is to prefix that behaviour with a thought, plan or mental representation which it serves to deliver. The second is a kind of intentionality that is launched and carried forward in the action itself, and corresponds to the attentive quality of that action. It is the intentionality not of an isolated mind, of the cogitating subject confronting an exterior world of things, but rather that of a being wholly immersed in the relational nexus of its instrumental 'coping' in the world.

There is a certain (though as we shall see, inexact) parallel between the 'as if' actor and the inexperienced novice, and they fail for the same reason. Every act has to be thought out in advance, and once embarked upon, it cannot be changed without further deliberation which, in turn, interrupts the action. Attention *precedes* response, introducing a time lag which would make anything like orchestral playing or capturing reindeer with lassos completely impossible. The skilled practitioner, by contrast, is able continually to attune his movements to perturbations in the perceived environment without ever interrupting the flow of action, since that action is itself a process of attention. Skilled practice cannot, therefore, be understood as the application of objective knowledge in the form of an 'expert system', as though it followed the steps of (say) a 'cello-playing or lasso-throwing programme. This is not to deny that complex neurophysiological processes are involved, which operate on sensory inputs and yield appropriate motor responses. But it is to suggest that whatever goes on in the brain of the practitioner cannot be modelled as entailing anything analogous to mental rules and representations (Dreyfus 1991: 219). It is, of course, entirely tautologous to model neurological processes in this way and then, inverting the relation between model and reality, to claim that neurology provides independent confirmation for the existence of mental representations.

The novice becomes skilled not through the acquisition of rules and representations, but at the point where he or she is able to dispense with them. They are like the map of an unfamiliar territory, which can be discarded once you have learned to attend to features of the landscape, and can place yourself in relation to them. The map can be a help in beginning to know the country, but the aim is to learn the country, not the map. Similarly, the 'cello-teacher may place marks on the fingerboard to show the novice where to put his fingers in order to obtain different notes. The novice is thereby enabled to feel

for himself the particular muscular tensions in the left hand, and to hear the resulting intervals of pitch. Having learned to attend to these things, his fingers will find their own place (he can now play in tune), and the marks, which serve no further purpose, can be removed. The same applies to any other branch of apprenticeship in which the learner is placed, with the requisite equipment, in a practical situation, and is told to pay attention to how 'this' feels, or how 'that' looks or sounds – to *notice* those subtleties of texture that are all-important to good judgement and the successful practice of a craft. That one learns to touch, to see and to hear is obvious to any craftsman or musician. As Gibson succinctly put it, learning is an 'education of attention' (1979: 254).

This kind of learning exemplifies what Lave (1990: 310) has called 'understanding in practice', to which she counterposes 'the culture of acquisition'. The latter phrase denotes the theory of learning long favoured by cognitive science (and by Western educational institutions), according to which effective action in the world depends on the practitioner's first having acquired a body of knowledge in the form of rules and schemata for *constructing* it. Learning, the process of acquisition, is thus separated from doing, the application of acquired knowledge. It is implied, moreover, that a body of context-free, propositional knowledge – namely a technology or, more generally, a culture – actually *exists* as such and is available for transmission by teaching outside the context of use. Learning, in this view, entails an internalisation of collective representations or, in a word, *enculturation*. 'Understanding in practice', by contrast, is a process of *enskilment*, in which learning is inseparable from doing, and in which both are embedded in the context of a practical engagement in the world – that is, in dwelling. According to this theory of learning, the kind of know-how thus gained, 'constituted in the settings of practice, based on rich expectations generated over time about its shape, is the site of the most powerful knowledgeability of people in the lived-in world' (Lave 1990: 323).

By and large, discussions of the relationship between tool-using and speech have adopted the unequivocally 'logocentric' perspective of cognitive science and structural linguistics, whose ontological baseline postulates a rational subject positioned *vis-à-vis* an objective world. The aim has then been to demonstrate a parallel, overlap or even identity between cognitive structures involved in generating representations, on the one hand, of object assemblies (for execution as tool-using behaviour), and on the other, of word assemblies (for execution as speech). The former are glossed as 'technology', the latter as 'language'. The argument sketched above, however, suggests the possibility of a diametrically opposed approach, which takes as its ontological starting point the inescapable condition of human beings' engagement in the world, and that foregrounds the performative and poetic aspects of speech and tool-use that have been marginalised by rationalism. From the vantage point of this approach, the relationship between tool-using and speech, far from being the surface manifestation of a more fundamental deep-structural connection between technology and language, is really one between the vocal artistry of speech and song, and the technical artistry of craftsmanship. Moreover, I have found no absolute line of demarcation between speech and song, nor between singing with the voice and 'singing' with an instrument (as, for example, in 'cello-playing), nor between the latter and other forms of tool-assisted, skilled artistry even of a thoroughly practical, subsistence-oriented kind. One thinks, for example, of the harvester at work (see Chapter Eleven, p. 207), swinging his scythe in a constant, rhythmic, dancelike movement and singing as he does so: that, to my mind, is the archetypal situation of human tool-use, not the puzzle-solving scenarios beloved of cognitive psychologists.

INTELLIGENCE AND IMAGINATION

Human beings do, of course, solve puzzles: witness the chess-player devising a strategy of future moves, or the 'cellist working out the fingering for a difficult passage. How, from the point of view of a dwelling perspective, is this kind of puzzle-solving to be understood? And how would our account differ from the rationalist argument that regards every solution as the output of a cognitive device, an intelligence, located somewhere within the organism? This latter argument, as we have seen, sets out from the postulate of an original detachment of the intelligent subject, who has then to construct (or reconstruct) the world in his or her mind, prior to bodily engagement with it. The direction in which we proceed is precisely the reverse: postulating an original condition of engagement, of being-in-the-world, we suppose that the practitioner has then to *detach* himself from the current of his activity in order to reflect upon it. Only having achieved such a stance of contemplative detachment can he begin to ask such questions as (of an object) 'What can this be for?' or (of a word) 'What might this mean?' In answering them, he may suppose himself to be contributing meaning or value to an external world that, in itself, is devoid of significance, that is merely *there* for people to do with it what they will. There are, after all, many things you can do with a stone, and if, in response to my own or another's query, I say of that stone that it is a 'missile', am I not contributing my own subjective meaning to an otherwise meaningless, occurrent object?

A being who is dwelling in the world, however, does not encounter stones. He encounters missiles, anvils, axes or whatever, depending on the project in which he is currently engaged. They are available for him to use in much the same way as are the mouth, hands and feet. In the game of football, we use the feet for running and kicking; we do not, however, consider feet *as* feet (that is, as occurrent anatomical structures) and wonder what to do with them. Such may be the view of the cobbler or chiropodist, but he is playing a different game! As I have already shown in discussing the issue of how words acquire significance, meaning already inheres in the relational properties of the dwelt-in world. In order to release or 'free up' the qualities of objects in themselves, this original meaning has to be stripped away, reducing the 'available' to the 'occurrent'.[6] This is done by distancing ourselves from, or stepping outside, the activities in which the usefulness of these objects resides. Only by virtue of such dissociation do we come to confront the spectre of a meaningless environment, the kind of objective world 'out there' that, in the discourse of Western science, goes by the name of nature. Taking nature as a datum of existence, we may then see ourselves as dealing with it by appropriating it symbolically, by attaching cultural significance to its occurrent properties. In so doing, we attempt to recover the meaning that is initially lost through our disengagement from the current of practical action.

What, then, are we doing when we step outside of this current? Or to rephrase the question: what kind of activity does *not* involve a palpable engagement in the world? The answer is that it is activity of the special kind we call *imagining*. This is what the chess-player is up to when, sitting apparently immobile and without touching the pieces on the board, he nevertheless proceeds to work out a strategy. Now there are three points I wish to make about this kind of activity. The first is that imagining *is* an activity: it is something people *do*. And as an activity it carries forward an intentionality, a quality of attention that is embodied in the activity itself. Were it otherwise, were every instance of planning supposed to be prefixed by a prior intention in the form of a plan, we would at once be led into the absurdity of an infinite regress (Ingold 1986b: 312–13). We have already

seen that skilled practice cannot be understood as the mechanical execution of prefigured design; it is now clear that the same applies to the design process itself. Where this process of imagination differs from other forms of activity, and what makes it so special, is that attention is turned inwards on the self: in other words, it becomes reflexive. I dwell, in my imagination, in a virtual world populated by the products of my own imagining.

The second point, which follows from the first, is that whatever we call these products – whether plans, strategies or representations – their forms are generated and held in place only within the current of imaginative activity. The same, moreover, is true of material forms generated in the practical activity of craftsmanship. It is said colloquially, yet with good reason, that the craftsman *casts* the material into its projected form: the form, that is, arises out of a practical movement depicted metaphorically as a 'throw' (though in the case of the herdsman casting his lasso, this is quite literally true). Thus, as the musician casts sound into the form of a phrase, so likewise the potter casts clay into the form of a vessel. Yet unlike sound, clay congeals, and as it does so the form, generated in movement, is 'frozen' in the shape of a static artefact that endures beyond the context of its production. It is this, perhaps, that inclines us to think that in the making of artefacts, forms pre-existing as images in the mind are simply transcribed onto the material, as though the movement issued directly from the form and served only to disclose it (see Chapter Eighteen, pp. 343–6, for a critique of this view). The reality is more complex, since both the image of the projected form and the material artefact in which it subsequently comes to be embodied are independently generated and 'caught' within their respective intentional movements, of imagination and practice. The problem, then, is to understand the relationship between these two generative movements, a relationship that might be characterised, provisionally, as *rehearsal*. One may, in imagination, 'go over' the same movement as a preparation or pre-run for its practical enactment. But the enactment no more issues from the image than does the latter from an image for imagining.

The third point is that imagining is the activity of a being who nevertheless dwells in an actual world. However much he may be 'wrapped up' in his own thoughts, the thinker is situated in a time and place and therefore in a relational context. The scientist may indeed think himself to be an isolated, rational subject confronting the world as a spectacle, yet were he in reality so removed from worldly existence he could not think the thoughts he does. 'We do not have to think the world in order to live in it, but we *do* have to live in the world in order to think it' (Ingold 1996a: 118). This is why, as I mentioned earlier, the parallel between the novice practitioner, who has to work out his movements in advance, and the 'as if' actor whose behaviour is the output of a mental constructional device, is an inexact one. The 'as if' actor is the (fictitious) pure subject, possessed of a rational intelligence that delivers thoughts for execution. Such a subject can only dwell within a space circumscribed by the intellectual puzzles it sets out to solve (as against the objective world in which its solutions are applied). The novice, by contrast, though one step removed from the uninterrupted engagement of the skilled practitioner, nevertheless carries on his deliberations 'against a background of involved activity' (Dreyfus 1991: 74). He continues to dwell in a world that provides, above all in the presence of other persons, a generous source of support for his deliberations. The same is true of the scientist, who confronts nature in rather the same questioning way that the novice player confronts his instrument, as a domain of occurrent phenomena whose workings one is out to understand.

Here, then, we have the final, essential difference between intelligence and imagination. The former is the capacity of a being whose existence is wrapped up within a world of

puzzles, the latter is the activity of a being whose puzzle-solving is carried on within the context of involvement in a real world of persons, objects and relations. And of all the historical products of the human imagination, perhaps the most decisive and far-reaching has been the idea that there exists such a thing as an 'intelligence', installed in the heads of each and every one of us, and that is ultimately responsible for our activities.

Notes

1 For detailed ethnographic description of Cree attitudes to animals, see Feit (1973), Tanner (1979), Scott (1989) and Brightman (1993). I return to the idea of animals offering themselves to human hunters in Chapter Four (p. 67).

2 I return in the concluding section to the reasons why this point of observation cannot, in practice, be attained.

3 The occasion was the Nineteenth Annual Korzybski Memorial Lecture, presented in New York in January 1970, and the text was originally published in the *General Semantics Bulletin* of that year (volume 37).

4 This was the Gildersleeve Lecture, delivered at Barnard College, New York, in March 1972. The text first appeared in *Barnard Alumnae*, Spring 1972, and is reprinted as Lévi-Strauss (1974).

5 Bateson developed this idea in his last work, *Mind and Nature* (1980: 107). There are striking parallels here with ideas developed by two other major writers on the philosophy and psychology of perception, Maurice Merleau-Ponty and James Gibson (see Chapter Fourteen). Merleau-Ponty, in his essay on 'Eye and mind' (1964: 159–90), insisted on the 'intertwining of vision and [eye] movement', neither of which could occur without the other (p. 162). Gibson, for his part, placed movement at the heart of his ecological theory of visual perception, regarded as 'a process of *information pickup* involving the exploratory activity of looking around, getting around, and looking at things' (1979: 147). All three authors stressed the primacy of the perceiver's total sensory engagement with the environment. The convergences are striking, especially bearing in mind that they came from such different intellectual backgrounds. There is no evidence that Bateson ever read or took the slightest note of the work of either Gibson or Merleau-Ponty. A comparison of their respective ideas is, however, long overdue.

6 The Pintupi, whose country borders that of the Walbiri to the southwest, adopt a rather similar procedure. When young men are to be initiated, 'fathers, older brothers and other close relatives take them to sacred sites and show them rituals. They are "introduced" (*nintinu*) to the place. This visiting and seeing the site, learning about it, become important in laying claim to control or share in the control of a site' (Myers 1986: 151). The acquisition of knowledge through initiation, whereby it passes from 'outside' to 'inside', is described as 'giving (*yunginpa*) knowledge to young people, as revealing (*yutininpa*) it, or as teaching (*nintininpa*) it' (pp. 242, 68). I return to the Pintupi ethnography in Chapter Three (pp. 52–4).

7 Howard Morphy appears to invoke the notion of the key in just this sense, in his account of the interpretation of so-called 'geometric' designs in the paintings of the Yolngu, an Aboriginal people of Northeast Arnhem Land. He invites us to consider a simple (and very common) motif: a circle with a line running into it. The first clue links the design with a familiar waterhole (the circle) into which there drains a creek (the line). The next links it to old man kangaroo, who made the waterhole by digging a well (the circle), using his tail as a digging stick (the line). And the next links it to the old man's penis (the line) emerging from the waterhole to penetrate the vagina (the circle) of a lady kangaroo who was bending over to drink. Through these successive revelations, the experiences of topography, subsistence activity and sexual relations are all drawn together in an ongoing process of discovery (Morphy 1991: 169). Morphy, however, confuses the clue with the cipher, and proceeds to describe these revelations as decodings which gradually empty the formal design of its semantic content.

8 These examples are taken from *Janáček's Uncollected Essays on Music*, edited by Mirka Zemanová (1989: 106, 117, 195, 224). In letters to the great love of his life, Kamila Stösslová, Janáček jotted down the snort of his favourite domestic pig, but confessed to having some difficulty with notating the 'strange melody' of the cock that woke him every morning (Tyrrell 1994: 22, 77).

CHAPTER TWO   THE OPTIMAL FORAGER

1 These lines were written prior to the publication, in 1998, of an article by James L. Boone and Eric Alden Smith. Ostensibly a critique of 'evolutionary archaeology', an approach that seeks to explain change in the archaeological record as a result of the direct action of natural selection on variation in artefacts and behaviour, the article in fact sets out to restate the contrasting position of human evolutionary ecology. What this restatement offers, however, is an almost total retraction of the earlier claim of evolutionary ecology to account for locally adapted foraging strategies as the outputs of algorithms shaped by the operation of natural selection on culturally transmitted information. These strategies, Smith and Boone now argue, are not attributable to natural selection at all, but to the operation of capacities of rational choice and decision-making that all humans have in common and that owe their formation to 'earlier evolutionary processes extending back thousands or millions of years' (1998: S145). This, they go on to declare, 'is the fundamental tenet of evolutionary ecology' (p. S156). If so, then evolutionary ecology has effectively capitulated to evolutionary psychology, and the difference between them is merely one of emphasis: on the phenotypic plasticity of adaptive responses to particular environmental circumstances, as against the universal, genotypic hardwiring of evolved human problem-solving capacities. Thus evolutionary ecology, in its new guise, remains committed to an ecological perspective only in its insistence that the adaptive strategies it seeks to explain *have not evolved*!

CHAPTER THREE   HUNTING AND GATHERING

1 Subsequent ethnographic work among the Mbuti has, it should be noted, cast considerable doubt on the authenticity of Turnbull's somewhat 'romantic' account. Thus, Grinker (1992) fails to find indigenous conceptions that would correspond to the feeling for the forest that Turnbull imputes to the Mbuti. And Ichikawa (1992) observes that Mbuti attitudes towards the forest are, in reality, decidedly ambivalent: the forest is held to be the home of destructive as well as benevolent powers. But such ambivalence is equally characteristic of intimate relations in the human domain, which also have their undercurrent of negativity. However by addressing the forest as 'Father', Ichikawa states, Mbuti 'are appealing to it for the benevolence normally expected from a parent' (1992: 41).

2 In responding to the criticisms of Abramson (1992) and myself (Ingold 1992b), Bird-David significantly softens this contrast. Following Gudeman (1992), she stresses the pragmatic – as against the cognitive – aspect of modelling, regarding it in the first place as a kind of activity or performance. Through performance, the model is actualised as lived experience. Considering the example 'a dog is a friend', she points out that by bestowing the affection due to a human familiar upon her dog – to which the dog evidently responds by showing every sign of affection for her – it actually *becomes* a friend, and is not merely 'thought of' as such (Bird-David 1992a: 44). To refer to the dog as her friend is thus to draw attention to an underlying quality of relationship that can subsist just as well in gestures towards non-human as towards human familiars. This argument, though it comes close to agreement with that advanced in this chapter, by the same token departs significantly from the approach of Lakoff and Johnson (1980).

3 As Bird-David puts it, in connection with the friendliness of her dog (see note 2, above), the dog is not merely 'like' a friend, 'it *is* a friend' (1992a: 44).

4 This contradiction has also been noted by Edward Casey. 'Whom are we to believe?', he asks, 'The theorizing anthropologist, the arsenal of his natural attitude bristling with explanatory projectiles that go off into space? Or the aborigine on the ground who finds this ground itself to be a coherent collection of pre-given places – pre-given at once in his experience and in the Dreaming that sanctions this experience?' (Casey 1996: 15).

CHAPTER FOUR   FROM TRUST TO DOMINATION

1 For more detailed reviews and analysis of the 'savage' in literature, see Street (1975), Berkhofer (1979) and Barnard (1989).

2 I return to this comparison, and to some of the pitfalls that it harbours, in Chapter Twenty (pp. 363–5).

3 In the opinion of Sir John Lubbock, writing in 1865, the comparison of savages to children 'is not only correct but also highly instructive . . . The life of each individual is the epitome of the history of the race, and the gradual development of the child illustrates that of the species . . . Savages, like children, have no steadiness of purpose' (1865: 570).

4 Just what 'being alive' entails is a matter I explore in greater depth in Chapter Six (pp. 95–8).

5 For examples, see Marshall (1961) on Kalahari Bushmen, Turnbull (1978) on the Mbuti Pygmies, Dentan (1968) and Robarchek (1989) on the Semai, Briggs (1970) on the Inuit and Howell (1989) on the Chewong.

6 See, for example, Fienup-Riordan (1990: Ch. 8) on the Yup'ik Eskimos.

7 I should stress that the contrast I am drawing here is between hunting and pastoralism as ways of relating to animals, not between hunting and pastoral *societies*. It is perfectly possible for the same people in the same society to relate concurrently to different animals in quite different ways. The Blackfoot Indians of the North American Plains, for example, were hunters in relation to the buffalo, but herdsmen in relation to the horse (Ewers 1955).

8 Pernille Gooch's recent study of the Van Gujjars, nomadic buffalo pastoralists inhabiting the forested foothills of the Indian Himalayas, presents a fascinating exception to this argument, in three respects. First, the Van Gujjars relate to their buffaloes in the same way that they relate to other animals native to the forest: thus if the latter are classed as 'wildlife', then buffaloes are wildlife too, despite their evident tameness and familiarity with humans. All are 'at home' in the forest world. Secondly, the principle of this relationship, according to Gooch, is one not of domination but of trust. Thirdly, the forest – along with its animal inhabitants – is likened not to a parent but to a child. Thus people provide the environment of nurture in which trees and buffaloes grow and thrive, rather than vice versa (Gooch 1998: 186–7, 192, 209). The key to understanding this case lies in the fact that the Van Gujjar do not hunt, nor do they ever kill or eat their buffaloes – the animals are kept exclusively for their milk, and eventually die of old age. On the one hand, this makes it possible for Van Gujjar to extend the pastoral attitude of parental care from their buffaloes in particular to the forest and its creatures in general; on the other hand, it divests the caring relationship of its more coercive, authoritarian aspects. Though more cared for than caring, buffaloes retain a measure of control over their destiny.

9 In an influential article, Nicholas Humphrey takes the idea that one could share with animals to be an example of the 'fallacious reasoning', commonly branded as magic, in which 'primitive and not so primitive peoples' are said to indulge. Their mistake, Humphrey tells us, is to suppose that you can transact with non-human entities just as you can with human partners. In this, you are bound to be disappointed, since 'nature will not transact with man, she goes her own way regardless' (Humphrey 1976: 313). But it is surely Humphrey's reasoning, not that of the primitive, that is fallacious. For it assumes, from the start, a separation of nature and humanity that is in reality the consequence of transactional failure, not its cause.

CHAPTER FIVE   THINGS, PLANTS, ANIMALS AND CHILDREN

1 Deleuze and Guattari (1988: 18) contrast the agricultural practice of sowing seeds derived from an ancestral stock in fields carved out from the forest, with the horticultural practice of successive planting, unearthing and replanting of cuttings or offshoots. They link the former to a peculiarly Western ontology of transcendence, and to a genealogical model of relatedness: every seed is an individual entity whose nature is fixed by descent and revealed in its growth. The latter however, which is characteristic of Hagen practice, is seen to instantiate a non-Western ontology of immanence. For every cutting or offshoot is itself a section of a path of growth, one of the reticulate network of paths comprising the garden as a whole. Every strand of this network, which Deleuze and Guattari liken to a rhizome, is the embodiment of a relationship. I return to the contrast between genealogical and relational models in Chapter Eight.

2 The use of the idiom of parental nurture to talk about the growth of tuberous plants is widely reported in Melanesian ethnography. Sabarl gardeners, for example, 'think of their growing food as being like children, and see themselves in the role of parents who by giving nurture now will be nurtured by their offspring' (Battaglia 1990: 94). And Matayans refer to their yam seed tubers, once harvested and lifted from the ground, as sons (Gross 1998: 264).

3 Japanese upland foresters, according to John Knight, would see it both ways. Every tree, they say, has two lives. In its first life, the tree is grown in the ground. 'Foresters', Knight reports, 'liken tree-growing to child-rearing. The raising of the young tree saplings is characterised as parental nurturance. According to one local expression, the forester should "treat the mountain as though you are bringing up a child"' (Knight 1998: 199). Upon being felled, however, the tree enters its second life, when it 'goes to work' as a house timber. The incorporation of the tree into the building, after felling, is compared to the incorporation of a woman into the household after marriage. Now it is the tree that brings up the human inhabitants of the household, just as a mother nurtures her children. Despite having been cut down, the tree is still alive, it 'breathes' (1998: 205, 213).

4 In a review of the book in which an earlier version of this chapter appeared (Harris 1996), Peter Rowley-Conwy picks up the phrase 'continuous field of relationships', but takes it to mean something entirely different from what I intended – namely, a *continuum of variation* between the poles of foraging and farming. Accordingly, he portrays me as an advocate of the view that the transition from one pole to the other was gradual, progressive and wide-ranging. This view, as he correctly observes, was propounded by Eric Higgs and his associates some three decades ago (Higgs and Jarman 1969), but has been increasingly called into question by studies which point to a more irregular pattern of multiple, short-term and local transitions (Rowley-Conwy 1998: 218–19). There is nothing, however, in the notion of a relational field encompassing plants, animals and humans to suggest that it cannot undergo rapid transformation in particular regions.

Chapter Six A circumpolar night's dream

1 Hallowell's work was carried out in the decade 1930–40 among the people of the Berens River band, numbering about nine hundred. These people were often known as the Saulteaux (derived from *Saulteurs*, a name given them by French traders which translates as 'people of the rapids'). In much of his earlier work, Hallowell himself referred to them by this name (Hallowell 1955); moreover it is customarily used as a term of self-identification by the people themselves. Many other authors refer to the people inclusively as Ojibway. An alternative designation, officially adopted by the Bureau of American Ethnology, was Chippewa (*ibid.*: 115). However Wub-e-ke-niew (1995: xviii), who refers to his people of Red Lake as Ahnishinahbæeó'jibway (literally 'Ojibway people'), claims that 'Chippewa' was an entirely artificial category that the US Government created by lumping them together with French Métis people in the region involved in the fur trade. Steinberg (1981) provides a useful summary account of the history, distribution, organisation and nomenclature of the Ojibwa/Saulteaux bands around Lake Winnipeg. For the sake of simplicity and consistency with Hallowell's later usage, I will continue to refer to them as Ojibwa.

2 All the ethnographic material in this chapter, unless stated to the contrary, is drawn either from this article, or from the earlier collection of Hallowell's essays, *Culture and Experience* (1955). Page references will be provided only for direct quotations from these sources, or where I cite very specific points. 'Ojibwa ontology, behavior and world view' will be abbreviated throughout as OO, and *Culture and Experience* as CE.

3 From my (so far) very limited and superficial reading of the ethnography on native Amazonian societies, I have been startled by the recurrence of just the same themes here too. The parallels are extraordinary, and warrant further investigation (see, especially, Descola 1992, 1996, and Viveiros de Castro 1998).

4 This is the assumption that John Kennedy (1992) makes, in branding as anthropomorphic any attempt to attribute to animals such things as mental states, motivations, intentions and feelings. For Kennedy, any attribution of this sort is a 'definite mistake', a dereliction of scientific reason, or worse still, 'a throw-back to primitive animism' (1992: 9, 32). But in criticising what he sees as the anthropo*morphic* bias in studies of animal behaviour, he fails to address, or even to notice, the anthropo*centric* bias in his own thinking, which equates the condition of humanity with the power of rational intelligence to overcome the determinations of nature. This bias has no empirical justification whatever *in* science; it is, however, a crucial part of the ideological justification *for* science.

On the distinction between anthropomorphism and anthropocentrism, see Viveiros de Castro (1998: 484–5, fn.11).

5   This is a wonderful example of what Viveiros de Castro (1998) calls 'perspectivism', namely the conception 'according to which the world is inhabited by different sorts of subjects or persons, human or non-human, which apprehend reality from distinct points of view' (1998: 469). These apprehensions are not alternative points of view of the same world, as orthodox cultural relativism would have it, but rather result from a carrying over of the same point of view into alternative realities. Thus to be a person is to assume a particular subject-position, and every person, respectively in their own sphere, will perceive the world in the same way – in the way that persons generally do. But *what* they see will be different, depending on the form of life they have taken up. Thus if beaver are food for human persons, then they are food for non-human persons also, such as for the Thunder Bird and the 'masters' of the hawks. But what are 'beaver' for the birds are batrachians and reptiles from the perspective of humans.

6   Significantly, while spirits of the dead and grandfathers have the same dual structure, of inner essence and outward form, only the former can appear as ghosts, since the latter never die (CE, pp. 179–80).

7   Nurit Bird-David makes an almost identical point in her analysis of the notion of *devaru* among the Nayaka, hunter-gatherers of South India. A certain stone may reveal itself to be *devaru* if it comes towards a person or, as in one reported instance, jumps up onto her lap. Whether it is *devaru*, or just another stone, will depend on whether it engages in any kind of relationship with Nayaka people. Thus 'devaru are not limited to certain *classes* of things. They are certain things-in-situations of whatever class or, better, certain situations' (Bird-David 1999: S74–5).

8   The Cree people, neighbours of the Ojibwa who speak a closely related Algonkian language, have a virtually identical word meaning 'life', *pimaatisiiwin*. Colin Scott (1989: 195) reports that one Cree man translated the word as 'continuous birth' (see Chapter Three, p. 51). This translation seems to resonate perfectly with Ojibwa notions.

9   In a discussion of the attribution of animacy to stones, J. Baird Callicott suggests that it is just as reasonable to assume that all corporeal things, including animals, plants, and even stones, have an 'associated consciousness', as it is to assume that none do (with the singular exception of human beings). He identifies the former assumption with the 'Indian attitude', and the latter with the attitude of Europeans and Euro-Americans. But in setting up this contrast, Callicott remains imprisoned within his Western preconception that 'to be "alive", i.e., conscious, aware or possessed of spirit' is a property intrinsic to things as such, rather than thinking of life as the generative movement wherein they come into being through the unfolding of wider fields of relationship (Callicott 1982: 301–2).

10 In his chapter on 'language', Wub-e-ke-niew explains that in his native Ahnishinahbæó'jibway, 'rather than acting upon the world . . . one acts in concert with the other beings with whom one shares Grandmother Earth . . . A person harmoniously "meets the Lake", rather than "going to get water"' (Wub-e-ke-niew 1995: 218).

11 Since the Ojibwa have no concept of the natural, Hallowell maintains, they also lack any notion of the supernatural. It would therefore be quite wrong to interpret Ojibwa ideas, for example, about the animacy of certain stones or the power of other-than-human persons within the framework of a natural–supernatural dichotomy (OO, p.28). Åke Hultkrantz (1982) disagrees. The distinction between a natural and supernatural reality, in his view, is a universal foundation for human religious experience. It is not, he writes, 'a distinction in a philosophical sense, between two absolutely separate worlds, but a more practical distinction between an everyday reality and a reality of another order to which spirits and miracles belong' (Hultkrantz 1982: 179). However, Hallowell's point, if I understand him right, is that the experience of other-than-human persons is one of superior power, rather than one of a reality that is superior to nature. Such experience amounts to an intensification rather than a transcendence of everyday reality. Smith (1998: 423–4) makes a similar point in a recent essay on the ontology of the Chipewyan.

12 As this example shows, the very openness of the Ojibwa self to the world, especially in dreams, has its downside. For it renders the self peculiarly vulnerable to the potentially hostile intent of other persons. This accounts for people's chronic anxiety, vividly documented by Hallowell (CE, pp. 250–90), about falling victim to sorcery and other kinds of covert attack, for the mutual suspicion that lurks beneath the placid surface of interpersonal life, and for what – to the outsider – looks like an exaggerated concern to avoid causing offence to others (OO, pp. 40, 47).

13 The so-called 'shaking tent ceremony' is common to both the Ojibwa and their neighbours, the Cree. For detailed descriptions of the Cree ceremony, see Feit (1994) and Brightman (1993: 170–6).

The multilingual character of the ceremony is especially clear from Brightman's account: thus the spirit voices issuing from the tent may speak in Cree, English, French, Saulteaux, Chipewyan, or unknown spirit languages. Since members of the audience differ in their knowledge of these languages, spirits may be intelligible to some listeners and not to others. Animal beings are recognisable from their intonations: 'bears speak in a low and rumbling voice, lynxes in a hissing voice, and fish with a gurgling intonation as if from underwater' (Brightman 1993: 174).

14 A further clue to the interchangeability of hearing and vision lies in the prevalence of metaphors of vision and sight in relation to the auditory experience of other-than-human persons in performances of the shaking tent ceremony (Hallowell 1942: 9–10). Moreover among the Cree, as Feit notes (1994: 292), the name of the ceremony, *koaspskikan*, contains a linguistic root which has been identified as meaning 'see, vision', along with 'try'.

15 In other words, it drops the anthropocentric assumption that automatically renders as anthropomorphic any attribution of intentions and feelings to non-human beings (see footnote 4).

CHAPTER SEVEN TOTEMISM, ANIMISM AND ANIMALS

1 The idea of comparing totemic systems and animic systems was proposed some years ago by Philippe Descola (1992: 113–15), who illustrates his argument with ethnography from Amazonian Indian societies. Following the classic studies of Lévi-Strauss (1964, 1966b), Descola conceives of totemism as a classificatory project that seeks to model social distinctions on the basis of given discontinuities between species in nature. This conception, however, is of limited value in the ethnographic context of Aboriginal Australia, where totemism is fundamentally about people's connections with the land.

2 Here, and in what follows, I draw extensively on Luke Taylor's (1996) superb study of bark painting in Western Arnhem Land. See also Carroll (1977) and Taylor (1989). I am most grateful to the National Museum of Australia, and to Luke Taylor in particular, for advice and assistance in relation to the two Kunwinjku paintings reproduced here (Figures 7.2 and 7.3).

3 Morphy (1992) has discussed this point in relation to the rather similar painting tradition of the Yolngu, whose homeland lies to the east of that of the Kunwinjku.

4 The classic account of this kind of depiction is Nancy Munn's *Walbiri iconography* (1973b). On more recent developments, see Crocker (1983) and Layton (1992a).

5 I draw here on the studies of Crawford (1977) and Layton (1985: 441–8). For an overview, see Layton (1992b).

6 Heonik Kwon notes that the 'perilous interchangeability' of the roles of predator and prey is a theme of common concern among indigenous hunters throughout the circumpolar north. In Siberia as in northern North America, 'the position of the human hunter is insecure. As soon as he succeeds in a predatory act, the hunter falls into the position of prey' (Kwon 1998: 119).

7 I am most grateful for John MacDonald, of the Igloolik Research Centre, for assistance with translating the Inuit text accompanying the drawings reproduced here as Figures 7.4 and 7.5, and for explaining the significance of *nasaittuq*. My thanks also to Michael Bravo for information on this point.

8 In Chapter Six, I discuss in detail the nature of this division as it figures in Hallowell's (1960) account of the ontology of the Ojibwa.

9 For more on this, see Ray (1967), Lévi-Strauss (1983), Fienup-Riordan (1987) and Oosten (1992).

10 Among the Ojibwa, whose ontology I discussed in Chapter Six, the spirits of animals and other non-human persons are not generally seen but are rather heard. Their presence may be invoked in the midst of the human community, as in the ceremony of the 'shaking tent', through the intonation of their distinctive voices. If the mask, for the Inuit and Yup'ik, is the *look* of other-than-human being, then likewise the spirit-voice is the *sound* of such being for the Ojibwa. And so what applies to masks in the one case applies to voices in the other. The true voice of the animal is its spirit-voice, which may bear little resemblance to the sounds or calls it 'naturally' makes. And when this voice is rendered audible through the efforts of a human performer, whether in ceremony or in the recital of myth, it does not disguise but displaces the performer's voice.

11 I am indebted to Eduardo Viveiros de Castro for this idea.

12 I return to this theme in Chapter Twenty-one.

CHAPTER EIGHT   ANCESTRY, GENERATION, SUBSTANCE

1   See Paine (1991) for a discussion of these issues in relation to the case of Norwegians and Saami, and Lane (1998) for comparable remarks on the status of Basarwa *vis-à-vis* Bantu-speaking populations in Botswana.

2   The source for this definition is the ILO Convention of 1989 on 'Indigenous and tribal peoples in independent countries'. According to Article 1.b of the Convention, people 'are regarded as indigenous on account of their descent from populations which inhabited the country, or geographical region to which the country belongs, at the time of conquest or colonisation or the establishment of present state boundaries . . .' (ILO 1989, Art 1.b).

3   John Barnes succinctly defines the genealogy as the 'account of one's descent from an ancestor or ancestors by enumeration of the intermediate persons' (1967: 101).

4   The distinction here, between a person's positioning as an abstract figure on a genealogical chart and their positioning as a living being in an inhabited world, corresponds to Bourdieu's (1977: 37–8) between 'official' and 'practical' kinship, the first conceived in exclusively genealogical terms, the second as relationships 'continuously practised, kept up, cultivated'. Bourdieu himself likens the contrast to that between routes marked on a map, and paths in the landscape kept open by regular use.

5   This is a paraphrase by Quinn and Holland (1987: 4) of an influential definition offered some thirty years previously by Ward Goodenough. In much the same vein, Clifford Geertz wrote that the information provided by culture closes the gap 'between what our body tells us and what we have to know in order to function' (1973: 50). See Chapter Nine (pp. 159–60).

6   The difficulties arise in part because rates of change along different lines of descent are not necessarily constant, and in part because of the possibilities of adaptive convergence. For these reasons, genealogical proximity cannot automatically be inferred from taxonomic likeness. These problems are discussed with regard to approaches to human diversity in historical linguistics and molecular genetics by Renfrew (1992: 447–8).

7   It is not. The source of the metaphor may lie in Gregory Bateson's classic, *Naven*, where he compares Iatmul and Australian Aboriginal kinship systems. In the Australian system people are divided into a fixed number of closed, bounded groups. The Iatmul community, however, comprises 'an infinitely proliferating and ramifying stock . . . which continually divides and sends out offspring "like the rhizome of a lotus"' (Bateson 1958: 248–9). I have suggested elsewhere (Ingold n.d.) that a better image than the rhizome might be that of the fungal mycelium. In an argument that parallels my own, the mycologist Alan Rayner has asked what biological science would look like had the fungus, with its underground network of mycelial fibres, rather than the animal, as a discrete self-contained entity bounded by the skin, been taken as the paradigmatic instance of a life-form (Rayner 1997). For my present purposes I shall stay with the image of the rhizome, since it enables me to incorporate into my discussion some (though by no means all) of the ideas of Deleuze and Guattari. My use of this image, however, departs significantly from theirs, and perhaps comes closer to Bateson's original conception. For while their aim is to liberate our thinking from the constraints of linear and hierarchical reasoning, mine is to return it to the contexts of lived experience.

8   Bird-David actually distinguishes the idiom of parentage adopted by the Nayaka and other gatherer-hunters from that of ancestry which, she argues, prevails among peoples whose livelihood is based on the cultivation of crops. Whereas parents give unconditionally, relations with ancestors are based on conditional reciprocity (1990: 190–1). Though significant in the context of Bird-David's argument, this distinction has no bearing on the appropriateness of the genealogical model, and need not concern us here.

9   Notice that Kroeber's tree of human culture, reproduced in Figure 8.1, is already straining in that direction: it retains its arboreal form, as it were, against the odds. Ralph Linton took this even further in choosing *The tree of culture* as the title for his massive survey of the world's civilisations, first published in 1955. In a posthumous preface to the book, Adelin Linton explains that the title refers 'not to the familiar evolutionary tree with a single trunk and spreading branches, but to the banyan tree of the tropics. The branches of the banyan tree cross and fuse and send down adventitious roots, which turn into supporting trunks' (Linton 1955: v). Commenting on this passage, James Fernandez argues that 'the banyan tree suggests a circularity, if not a tensile netlike interconnectedness of parts, in human affairs, . . . that the normal tree metaphor either conceals or cannot manage to convey' (Fernandez 1998: 99). Thus arboreal imagery, contrary to what Deleuze

and Guattari seem to think, does not *have* to be linear and hierarchical. It all depends on the form of what you take to be the prototypical tree.

10 The significance of the distinction between 'entity' and 'site' for understanding person and self has been recently, and most lucidly explored by Rom Harré (1998).

11 Elsewhere, I have elaborated on this point in relation to the Darwinian paradigm of evolutionary biology, which of course rests squarely on the genealogical model (Ingold 1986b: 105–6).

12 For help in the formulation of these ideas, I am indebted to James Leach. See also Leach (1997: 34–5) and Ingold (1999: 407–8).

13 Bird-David (1994: 596–7) likens the person in a hunter-gatherer community to a drop of oil floating on the surface of a pool of water. When these drops come together, they coalesce into a larger drop. But drops can also split up into smaller ones that may then coalesce with others.

14 This leaves us with the question of how the information specifying the linguistic code can be acquired in the first place. The only solution is to suppose that all human beings are innately endowed, from the start, with some kind of inbuilt decoding device. Indeed the genealogical model of cultural transmission inevitably has recourse to the positing of one or several such devices. For a critique, see Chapter Twenty-two (pp. 397–9).

15 A particularly clear example of the transformation wrought by the genealogical model on hunter-gatherer self-perceptions lies in the changing meaning of the Eskimo term *inuit* (the plural form of *inuk*, meaning 'person'). In the past to be a person, an *inuk*, meant to be alive, to inhabit a certain place, and to undergo growth and development within a nexus of social relations. The plural form, *inuit*, referred to 'existence', or 'the state of being animate'. It was not, as Henry Stewart points out, 'a classificatory noun, and most certainly not a collective designation for all original inhabitants of the Far North' (Stewart n.d.: 3). Since the early 1970s, however, *inuit* has been explicitly adopted as an ethnonym to be applied on the basis of common descent from a putatively aboriginal population. To be an *inuk*, then, is no longer to occupy a particular subject position *vis-à-vis* others, but to belong as a member of a more inclusive genealogically defined category.

CHAPTER NINE   CULTURE, PERCEPTION AND COGNITION

1 Geertz included his article of 1966 in a volume of selected essays, *The interpretation of cultures*, published seven years later. But he introduced the volume with a chapter in which, among other things, he denounces Goodenough's aforementioned definition of culture as 'the main source of theoretical muddlement in contemporary anthropology'. It has become, he complains, the *locus classicus* for a 'school of thought [which] holds that culture is composed of psychological structures by means of which individuals or groups of individuals guide their behavior' (1973: 11). Sensing that his readers may have some difficulty in distinguishing this view from his own, which is indeed expressed in almost identical terms, Geertz invites us to consider a Beethoven quartet. No-one, he declares, would equate the quartet with the score (comprising a set of instructions for the performers), or with any particular performance of it. For the quartet is neither of these things, but the music itself – 'a temporally developed tonal structure, a coherent sequence of modeled sound'. Whatever this might mean (and no-one, least of all Geertz himself, has been able to figure this out), it is clear that if culture is analogous to music in this sense, it is nothing like the 'instructions . . . for the governing of behavior' of the 1966 article. Rather than facing up to a blatant contradiction in his thinking, Geertz prefers, as Bradd Shore puts it, 'to write his way out of it' (Shore 1996: 34). It would not be unreasonable to conclude that if anyone has been a source of theoretical muddlement in anthropology, it is Geertz himself (see Strauss 1992: 5–7, Shore 1996: 32–5, 50–1).

2 The concept of *habitus* is not original to Bourdieu. It was introduced to anthropology by Marcel Mauss in his study, dating from 1934, of techniques of the body, to refer to the repertoire of culturally patterned postures and gestures to be found in any particular society (Mauss 1979: 101).

3 Claudia Strauss completely misunderstands what Bourdieu means by *habitus* when she describes it as just another species of cultural model, comprising a set of mental structures, unconsciously extracted from practice, internalised through informal learning, and applied in novel situations. She fails to realise that in placing the *habitus* at the centre of his theoretical project, Bourdieu's purpose is to demolish the oppositions between mind and world, and between knowledge and practice, upon which the whole programme of cognitive anthropology is founded (1992: 9). The same error is reproduced by D'Andrade (1995: 147–8).

4 In Chapter Two (pp. 37–8) we established this point with regard to the practice of hunting.

5 The contrasting terms are drawn, by analogy, from 'phonetics' and 'phonemics' in linguistics. See also Chapter Three, p. 41.

6 Gibson was by no means consistent on this point, and it has been a continuing source of dispute among his followers. The following passage, however, appears unequivocal:

> The observer may or may not perceive or attend to the affordance, according to his needs, but the affordance, being invariant, is always there to be perceived. An affordance is not bestowed upon an object by a need of an observer and his act of perceiving it. The object offers what it does because of what it is.
>
> (Gibson 1979: 139)

A critique of this view, from a more phenomenologically inspired standpoint, is presented by Varela, Thompson and Rosch (1991: 203–4). In their approach to cognition as 'embodied action', the environment of the perceiver exists only as it is enacted in and through a history of 'structural coupling', in which person and environment are strictly co-determined.

7 The affinity, here, between the approaches to perception and action of Merleau-Ponty and Gibson is striking – all the more so because they came from such different intellectual backgrounds. They were one in insisting upon the centrality of movement to visual perception. This convergence is further explored in Chapter Fourteen. Gibson never referred to Merleau-Ponty's work, but there is anecdotal evidence that he had read the *Phenomenology of perception*, and that he approved of it (Heij and Tamboer n.d.).

Chapter Ten   Building, dwelling, living

1 Approaches from ecological psychology and phenomenology are reviewed in Chapter Nine. For the developmentalist challenge to neo-Darwinism, see Chapter Twenty-one.

2 Characterising human beings, by contrast to apes, as 'thing users', Francis Evans notes how the human capacity to use things in diverse ways calls for an ability not only to abstract the qualities of objects – such as hardness, heaviness and shape – from the objects themselves, but also to relate these qualities to a certain project. 'A stick becomes different things according to desire: digger, pointer, walking aid, club – it is our perception, not the stick that changes. *Thing user* . . . has to make a mental pattern, akin to a gestalt perception, of what it wants to do' (Evans 1998: 195).

3 I return to this parallel between the dynamics of organic and technical change in Chapter Twenty (pp. 369–72).

4 Animal behaviourists do not, of course, rule out the possibility that conduct may be intentionally motivated. But they argue that intentions are but proximate causes of acts whose ultimate cause lies in tendencies or dispositions established through natural selection.

5 For a discussion of the implications of Heidegger's concept of dwelling for architecture, see Norberg-Schulz (1985).

6 In Chapter Twenty-two I show that on the same grounds, it is equally illusory to seek the origins of language.

7 I return to this point in the next chapter (pp. 206–7).

Chapter Eleven   The temporality of the landscape

1 Heonik Kwon (pers. comm.) makes the important point that unlike native dwellers, archaeologists do not incorporate into their own practice the modes of environmental engagement of the characters of whom they tell. That is to say, the peoples of the past whose lives are revealed through excavation were not themselves excavators. On remembering as a way of perceiving the environment, see Chapter Eight (pp. 147–8).

2 I am referring to land, here, in the specific sense entailed in the genealogical model (see Chapter Eight). In the alternative sense entailed in the relational model, land and landscape are much closer in meaning.

3 This contrast is further explored in Chapter Fourteen, where it is linked to a distinction between *wayfinding* (journeying from place to place in a region) and *navigation* (plotting a course from one location to another in space).

4 For an exemplary analysis of 'the rhythmic structures of economic life', see Guyer (1988).

5   For further confirmation of this point, again with reference to Australian Aboriginal ethnography, see Chapter Seven (p. 128).

6   Barbara Adam proposes a rather similar project, arguing that the kind of knowing entailed in what she calls the 'landscape perspective' needs to be extended through an attention to 'timescape', requiring us 'to develop an analogous receptiveness to temporal interdependencies and absences, and to grasp environmental phenomena as complex temporal, contextually specific wholes' (Adam 1998: 54).

7   David Lowenthal contrasts the perception, respectively, of works of art and of landscapes in similar terms. 'Works of art . . . are detached from the observer, framed in space and time, quite distinct from their milieux. But landscapes surround the observer, merging continuously with other landscapes to the horizon; the absence of a set frame challenges the viewer to create his own perspectives' (Lowenthal 1978: 375). This, of course, begs the question of how the perception of the landscape is reproduced in the art of painting. Indeed in seeking to represent, on canvas, the experience of dwelling, the landscape painter has to cultivate much the same duplicity as the ethnographer whose medium is the written word. Both are required to reflect, from a position of studied detachment, upon their own experience of engagement in the world (Ingold 1997).

8   In this regard, trees may be said to have a social life. However a recent volume, entitled *The social life of trees*, paradoxically took as its starting point a question that would deny to trees any such life. Contributors to the volume were asked to consider: 'To which symbolic ends have trees been used?' (Rival 1998: xiii). This is to suppose that the social life being symbolised is human, and that trees have no part in it.

9   Note that the distinction between coevalness and duration, represented by the corn and the tree, is not at all the same as the classic Saussurian dichotomy between synchrony and diachrony: the former belongs to the perspective of the A-series rather than the B-series, to the temporality of the landscape, not to its chronology (Ingold 1986b: 151).

10 On the idea of the key to meaning, as a clue rather than a cipher, see Chapter One (p. 22).

Chapter Twelve   Globes and spheres

1   The alleged opposition between visual and aural perception is the subject of Chapter Fourteen.

2   The artist Paul Klee wrote, in his notebooks, of 'our faltering existence on the outer crust of the earth' (Klee 1961: 5). Yet Klee's perspective was anything but a global one. His concern was rather to show how tenuous and superficial is the conceit that we could ever arrest the movement of the world or subordinate it to our own purposes.

3   I return to this conception of the earth's surface in the next chapter, where I show that it depends upon the specialised mode of apprehension of the cartographer or navigator (Chapter Thirteen, pp. 240–1).

4   Cooper distinguishes these two senses of environment by using capital letters for the former and lower case letters for the latter. Thus 'The Environment' is the object of modern scientific and geopolitical discourse, whereas 'the environment' comprises my familiar surroundings. The first is something that every living creature is *in*, the second is something that every creature *has* (1992: 167–9).

Chapter Thirteen   Maps, wayfinding and navigation

1   In the literature, it is more usual to bring traditional Micronesian seafaring skills under the general rubric of 'navigation'. I wish to avoid this, for reasons that will become clear later. In brief, I shall show that unlike their modern Western counterparts, Micronesian mariners were engaged in wayfinding as *opposed* to navigation.

2   Pandya suggests that people in Western societies generally proceed in the reverse order, first marking places at their respective locations, and then drawing in the connecting lines (Pandya 1990: 784). As I shall show, this contrast is probably exaggerated. Asked to draw an informal sketch map, for example to indicate the route to a friend's house, the Westerner may well proceed in the same order as the Ongee, starting with movements, despite his or her familiarity with the cartographic principles embodied in the modern, topographic map.

3 André Leroi-Gourhan (1993: 190) brings the production of traces of this kind under the general rubric of *graphism*. As he shows, graphism is deeply embedded within contexts of oral narrative, and may be as old as the accompaniment of speech by gesture – long antedating the advent of writing proper.

4 This has been taken one step further, as Thomas Widlok notes, with the development of the so-called 'Global Positioning System' (GPS), a satellite-supported device that enables the user to obtain, at any moment, a precise locational fix according to a universal set of coordinates. 'Both a map and a GPS depend on a history of human-environment interactions (observations, measurements, triangulations) from which the experiential aspects of the humans involved have been systematically eliminated to leave nothing but formalized, de-personalized procedures' (Widlok 1997: 326).

5 It is probably for this reason, as Benjamin Orlove (1993: 29–30) points out, that historians of cartography have focused on how people draw maps, almost to the exclusion of any concern with how people draw *on* maps. This bias has weighty political implications. Precisely because the topographic map renders invisible the movements, or ways of life, of the native inhabitants of a country, it can be a potent instrument of colonial expropriation.

6 This is not to deny that in their use of instruments, European navigators may rely just as much on *ad hoc* improvisation, based on current perception and past experience, as do Micronesian mariners in their handling of the boat itself (Suchman 1987: viii-ix).

7 I return to this issue of the status of material surfaces in Chapter Eighteen (pp. 339–41), in relation to the making of artefacts.

CHAPTER FOURTEEN   STOP, LOOK AND LISTEN

1 For an excellent discussion of this point, see Rée (1999: 42–5). He concludes that it is precisely in its inhabiting a world of ephemeral sounds rather than solid objects that hearing parts company from seeing: 'you do not hear things in the sound as you see them in the light' (p.43).

2 The same appears to be true of the apprehension of birds among the Kaluli of Papua New Guinea, who inhabit a densely forested environment. During his fieldwork among the Kaluli, Steven Feld found that their avian taxonomy was, first and foremost, a classification of sounds rather than living things. To Feld's persistent inquiries, his Kaluli companion, Jubi, retorted: 'Listen – to you they are birds, to me they are voices in the forest'. Reflecting on this comment, Feld observes that 'birds are "voices" because Kaluli recognise and acknowledge their existence primarily through sound' (Feld 1982: 45).

3 One of the leading advocates of this view of visual perception has been Richard Gregory. 'There seems to be no sudden break', Gregory writes, 'between *perceiving* an object and *guessing* an object. If all perceiving of objects requires some guessing, we may think of sensory stimulation as providing *data* for *hypotheses* concerning the state of the external world. The selected hypotheses, following this view, are perceptions' (1973: 61–3). And by the same token, '*illusions are failed hypotheses*' (p. 74, original emphases).

4 Heidegger, in particular, strove to regain this sense of belonging by replaying dominant visual metaphors in aural terms, and frequently invoked the kinship, in the German language, between *Hören*, *Horchen* and *Gehören* – hearing, harkening and belonging (Caputo 1985: 255).

5 In his essay on 'the notion of person, the notion of "self"', Marcel Mauss discusses the etymology of the Latin *persona*, and suggests that it may have been of Etruscan origin, perhaps originally borrowed from Greek. The idea of its derivation from *personare*, he thinks, was a retrospective invention (Mauss 1979: 78–9).

6 An intriguing variation on the same idea comes from the Japanese philosopher Yanagida Kunio (1875–1962), the acknowledged founder of Japanese folklore studies. According to Kunio, 'both speech and writing exist as means for expressing one's thoughts, but, at present, writing is not so close to thought as speech is. If speech is able to express eight thoughts out of ten, writing is only able to express six' (cited in Ivy 1995: 7).

7 The inspiration for this move comes from the philosophy of Merleau-Ponty, especially his essay 'Eye and mind' (Merleau-Ponty 1964a, see Stoller 1989: 37–40). I discuss Merleau-Ponty's ideas at much greater length later on in this chapter.

8 For helpful reviews of this philosophical lineage, see Jay (1993a: 21–82) and Synnott (1993: 128–55).

9 Descartes does qualify the analogy in one respect. You cannot direct light rays towards objects in the environment exactly as the blind man can direct his stick. This is possible, Descartes thought,

only for creatures such as cats, which can see in the dark by illuminating objects with rays shining from their own eyes (1988: 59). The idea that cats' eyes are like twin torches in the head was all that was left, by Descartes' day, of the once widely accepted notion – originally propounded by Euclid in his *Optica* (c. 300 BC) – that in all vision, rays of light are emitted from the eyes rather than reflected into them (Hagen 1986: 300–4).

10 Rorty is therefore wrong to claim that 'in the Cartesian model, the intellect *inspects* entities modeled on retinal images' (Rorty, 1980: 45). Descartes was very explicit that the job of the intellect was not to inspect but to construct, that this construction did not depend on any resemblance between the data on which it operates and the retinal image, and that any representations in the mind are products, not precursors, of its constructive activity. On this point, see Houlgate (1993: 102).

11 As Judovitz points out, 'Descartes's paradoxical reappropriation of vision by reason . . . corresponds to an act of denunciation of its phenomenal and experiential character' (1993: 78).

12 The following definition of intuition, from Descartes' 'Rules for the direction of our native intelligence' of 1628, may serve as an example of this usage: 'intuition is the indubitable conception of a clear and attentive mind which proceeds solely from the light of reason' (1988: 3).

13 Gibson has a particular problem with the sun and moon, along with other celestial bodies. For as he elsewhere concedes, the information that would specify their form and composition is just not available to the technologically unaided, terrestrial observer, who cannot move around them. As objects, therefore, they are not visible to the eye (1979: 259). Nor can sunlight or moonlight be seen 'as such'. How, then, can the sun or moon be seen at all?

14 On this point, Gibson chooses to take issue with Ronchi, whose views I have reviewed above. While he agrees with Ronchi that optics, as a science of vision, must be anchored on the eye, he holds that light depends on the presence of the eye not for its existence, but for its *relevance*. Its existence is a physical datum, its relevance is an ecological one (Gibson 1966: 222).

15 According to Cohen and Stewart (1994: 154–6), the illusion of vision is precisely that of supposing that you are 'looking out of your head through a window', or 'out of holes in your head where your eyes should be'. The brain, they say, has to work very hard to create this illusion. But it is certainly not an illusion that I have ever experienced, nor has anyone else to my knowledge.

16 Thus as Jay points out, Merleau-Ponty did not accept, as an ontological *a priori*, the radical cleavage between the 'real light' (*lumen*) of the physicists and the 'phenomenal light' (*lux*) of naive consciousness. For in his view, physical science 'grew out of natural perception, rather than being its antithesis or corrective' (Jay 1993b: 163).

17 Another way of putting this is to say that we should rediscover the seer that is in all of us, and that lies concealed behind our assumed role as spectators. The seer's way of seeing, as David Levin writes, 'is more primordial than our everyday way: its ecstatic openness, . . . though not understood, and not consciously practised, by more "ordinary" mortals, in fact underlies *all* human perception' (1988: 462).

18 Paul Klee, to whose art Merleau-Ponty makes frequent reference, encapsulated these points in his 'Creative Credo' of 1920. 'Art does not reproduce the visible but makes visible . . . The pictorial work springs from movement, it is itself fixated movement, and it is grasped in movement (eye muscles)' (Klee 1961: 76, 78).

19 Oliver Sacks documents a modern-day example of this phenomenon. It concerns a patient, Virgil, who after being blind for forty-five years, underwent an operation to restore his sight. Some time after the operation, he told Sacks that at the first moment, when his bandages were removed, 'he had no idea what he was seeing. There was light, there was movement, there was color, all mixed up, all meaningless, a blur'. Commenting on this, Sacks notes that 'when we open our eyes each morning, it is upon a world we have spent a lifetime *learning* to see. We are not given the world: we make it through incessant experience, categorization, memory, reconnection. But when Virgil opened his eyes . . . there was no world of experience and meaning awaiting him. He saw, but what he saw had no coherence' (Sacks 1993: 61).

20 Levin makes a similar point, in somewhat more elaborate terms: 'the seer is seen and sees himself as seen, seen through what he sees. The seer can feel his seeing as it is felt, or received, by the other, the one who sees' (1988: 333).

21 Juhani Pallasmaa elaborates on this point with regard to the acoustic properties of architecture:

> One can . . . recall the acoustic harshness of an uninhabited and unfurnished house as compared to the affability of a lived-in home, in which sound is refracted and softened by the numerous surfaces of the objects of personal life. Every building or space has its characteristic sound of

intimacy or monumentality, invitation or rejection, hospitality or hostility. A space is conceived and appreciated through its echo as much as through its visual shape, but the acoustic percept usually remains an unconscious background experience.

(Pallasmaa 1996: 35)

22 As an example of this prejudice, Armstrong, Stokoe and Wilcox cite an influential textbook in linguistics by John Lyons, in which it is claimed that 'sign language', 'body language' or 'the language of bees' would be considered by most people as a metaphorical use of the word 'language' (Lyons 1981: 2, see Armstrong, Stokoe and Wilcox 1995: 65). Brenda Farnell (1995: 31–8) has shown how the denigration of gesture, its association with humanity in its primitive or animal state, is a concomitant of the very same evolutionary bias that has led generations of Western scholars to take writing as the measure of civilisation. The resulting exclusion of sign languages from linguistics, as she points out, has severely impeded the proper recognition of the signed languages of the deaf, and research into their structure.

23 'Par exemple, dans une forêt, j'ai senti à plusieurs reprises que ce n'était pas moi qui regardais la forêt. J'ai senti, certains jours, que c'étaient les arbres qui me regardaient, qui me parlaient. Moi, j'étais là . . . écoutant' (Charbonnier 1959: 143). This passage is cited by Merleau-Ponty in his 'Eye and mind', but is introduced with the words: 'As André Marchand says, after Klee . . .' (Merleau-Ponty 1964a: 167). Presumably, Merleau-Ponty meant that Marchand's words echoed the sentiments that Klee had often expressed, though in other terms. However the passage from Charbonnier's interview with Marchand is reproduced once again in Paul Stoller's essay, 'Eye, mind and world in anthropology' (Stoller 1989: 38), where it is attributed directly to Klee (cited by Marchand, in Charbonnier, cited by Merleau-Ponty)!

24 This point is established, with specific reference to Yup'ik and Inuit masks, in Chapter Seven (pp. 123–4).

25 For example it is well established, according to Sacks, 'that in blind people who read Braille the reading finger has an exceptionally large representation in the tactile parts of the cerebral cortex' (1993: 70). In a representation of the sensory homunculus, therefore, this finger would appear grossly enlarged.

26 The idea that it is possible to enumerate the senses has been cogently criticised by Seremetakis. 'Enumerated sensory capacities and the corresponding segmentation of material experience into specialized semantic domains', she writes, 'may freeze the actual fluidity of sensory crossing and mutual metaphorization of one sense by another . . . Enumeration thus imposes an objectifying grid that distorts or effaces the manner in which a culture senses the senses'. Moreover, the notion that in any specific culture, a certain balance or ratio may be struck between the senses implies that each may be reduced to a common denominator which is itself 'natural' or 'pre-cultural' (Seremetakis 1994: 126).

27 Levin spells out this view in a passage of incomparable verbosity. 'In fact', he writes, 'the field of visibility yields itself much more readily than do all the other fields of sense to the kind of structuring process which wilfully *re-presents* whatever presents itself, so that every presence manifesting in the field of vision is essentially reduced to the ontology of a mere thing' (Levin 1988: 65).

CHAPTER SIXTEEN   SOCIETY, NATURE AND TECHNOLOGY

1 Leslie White (1959: 18–28) offers a classic statement of this position; see also Harris (1968: 232).

2 This idea of technical classification seems, in many ways, to anticipate the notion of the 'constellation of knowledge' subsequently developed, *inter alia*, by Wynn (1993: 396–403) and Keller and Keller (1996: 89–107). The constellation is an idiosyncratic collection of various bits and pieces of knowledge – aesthetic, stylistic, functional, procedural, financial – peculiar to each individual artisan (rather than shared) and assembled specifically for the task at hand (rather than forming part of an enduring tradition).

CHAPTER EIGHTEEN   ON WEAVING A BASKET

1 To adopt an architectural term, the coherence of the basket is based upon the principle of *tensegrity*, according to which a system can stabilise itself mechanically by distributing and balancing

counteracting forces of compression and tension throughout the structure. Significantly, tensegrity structures are common to both artefacts and living organisms, and are encountered in the latter at every level from the cytoskeletal architecture of the cell to the bones, muscles, tendons and ligaments of the whole body (Ingber 1998).

2   This prioritisation of design over execution betrays a ranking of intellectual over physical labour that, as we saw in Chapter Sixteen, is one of the hallmarks of Western modernity. It divides the scientist from the technician, the engineer from the operative, the architect from the builder, and the author from the secretary.

3   In a wonderful article on the building of the great cathedral of Chartres, in the thirteenth century, David Turnbull (1993b) shows that this most magnificent of human artefacts was preceded by no plan whatsoever. The building took shape gradually, over a considerable period of time, through the labour of many groups of workers with diverse skills, whose activities were loosely co-ordinated by the use of templates, string and constructive geometry.

4   I do not intend by this to reinstate the time-worn opposition between practical utility and symbolic meaning. The notion of utility implied by this opposition is an impoverished one that sets up a radical division between the acting subject and the object used, and reduces skilled practice to purely mechanical relations of cause and effect. In speaking of the *absorption* of artefacts into the life-activity of their users my aim is to emphasise, to the contrary, the inseparability of persons and objects in real-life contexts of accustomed (that is, usual) practice. The usefulness of an object, then, lies not in its possession of utility but in its partaking of the *habituality* of everyday life (Gosden 1994: 11).

5   Among the Bunu, a Yoruba-speaking people of central Nigeria, this idea is expressed in their weaving of lengths of white cloth:

> Cloths are often removed [from the loom] without cutting, accentuating the endless quality of these pieces. When eventually the unwoven warp is cut in order to use the cloth, the fringes are left, again suggesting continuity rather than the finiteness of cut and hemmed edges.
>
> (Renne 1991: 715)

CHAPTER NINETEEN   OF STRING BAGS AND BIRDS' NESTS

1   This shift in the meaning of technology, from a systematic mode of inquiry to the generative logic of practice, remained more or less confined to the Anglophone world. In France, technology continues to this day to mean 'the study of techniques'. For this reason, the word technique has retained its connotation of skilled craftsmanship. And French scholars have taken the lead in developing an anthropological approach to craft skills (Sigaut 1985).

CHAPTER TWENTY   THE DYNAMICS OF TECHNICAL CHANGE

1   Marx is referring, in this passage, to the principle thesis of Giambattista Vico, in his *New Science* of 1725. Vico had berated philosophers for having wasted so much effort in studying the world of nature which, having been made by God, ultimately lies beyond human comprehension, at the expense of the study of things which owe their origination to the human mind and which philosophers – being human too – could hope to understand.

2   For a review of the contributions of Butler and Pitt-Rivers, see Basalla (1988: 15–21). On evolutionary archaeology, which is but one of several recent approaches that have sought to apply Darwinian principles in the explanation of technical change, see O'Brien (1996). For a critique, see Boone and Smith (1998).

3   This general conclusion even applies to the 'invention' of the alphabet, often described as the most perfect system ever devised for representing the sounds of speech, and as the goal towards which the evolution of writing has naturally progressed. David Olson, however, has shown that the development of the alphabet was a contingent consequence of attempts to put a script adapted for use in one language – namely Semitic, in which vocalic differences were relatively insignificant – to use in another – namely Greek, where they were highly significant (Olson 1994: 84).

Chapter Twenty-one 'People like us'

1 From her studies of skeletal remains from the Neolithic village of Abu Hureyra, in what is now northern Syria, Theya Molleson was able to deduce that the village's female inhabitants had spent long hours kneeling on the ground while grinding grain on a saddle quern. Patterns of wear on the big toes and knees, and bulges in the bones of the upper arm and forearm at the points of attachment of what would have been strongly developed muscles, are entirely consistent with this interpretation. It is tempting to regard these marks of activity upon the skeleton as deformities or abnormalities (Molleson 1994: 62–3). Yet the bones of the skeleton can grow and take shape only within a body that is active in the world; hence one can define the 'normal' skeleton only in relation to 'normal' activities. Why should the notched kneecap that comes from prolonged squatting be regarded as abnormal when, for the great majority of the human population, this is the usual position of rest? It is only perceived by us as an abnormality since, having been brought up in a society in which it is usual to sit on chairs, we find having to squat for any length of time acutely stressful. There can, then, be no such thing as the standard form of the human skeleton.

2 I develop this argument further in the following chapter (pp. 397–8).

3 The story of this confusion, which – if anything – is still more prevalent today than in those heady days when the structure of DNA was first unravelled, is superbly documented by Lily Kay (1998), and I have drawn on her account here.

4 One of the most bizarre examples of this kind of thinking comes from a recent book, widely hailed as a masterpiece in evolutionary psychological circles, by Donald E. Brown. Entitled *Human universals*, the book offers a comprehensive description of what Brown calls 'Universal People' (UP). The UP are characterised by a compendium of traits that 'all people, all societies, all cultures, and all languages have in common' (Brown 1991: 130). These traits are said to add up to what is popularly known as human nature, whose evolution is confidently attributed to natural selection, and whose ultimate foundation lies in the genes. Since no human population has ever existed that remotely resembles the UP, it is difficult to see how they could have evolved. In fact what Brown presents, in the guise of a suite of universal characteristics, is a thinly veiled version of the Western model of the person.

Chapter Twenty-two Speech, writing and 'language origins'

1 This is the kind of circularity that Jacques Derrida is getting at when he asks what a science of writing would be like, given that the very ideas of science and scientific objectivity depend on writing. 'The science of writing should . . . look for its object at the roots of scientificity. The history of writing should turn back toward the origin of historicity'. But can there be a 'science of the possibility of science', or a 'history of the possibility of history'? (Derrida 1974: 27).

2 This conclusion was anticipated by V. N. Vološinov in his remarkable study *Marxism and the philosophy of language*, first published in Russian in 1929. Language, Vološinov argued, is not tossed like a ball from generation to generation, but moves together with, and is indeed inseparable from, the actual current of speech:

> Language cannot properly be said to be handed down – it endures, but it endures as a continuous process of becoming. Individuals do not receive a ready-made language at all, rather, they enter upon the stream of verbal communication; indeed, only in this stream does their consciousness first begin to operate. . . . People do not 'accept' their native language – it is in their native language that they first reach awareness.

(Vološinov 1973: 81)

3 Intriguingly, in the languages of the Gonja and LoDagaa, both non-literate societies of northern Ghana, there is no word for 'word' (Goody 1977: 115).

Chapter Twenty-three The poetics of tool use

1 Whether the people of any known society have ever been 'modern', in the strict sense, is rather doubtful (Latour 1993). We may therefore have to admit that 'modern society' is a fiction of the same order as the economists' 'economic man' or the 'rational individual' of political science.

2   One issue arising from this concerns the nature of the difference between writing and musical nota-
    tion. It seems reasonable to suppose that this difference reflects the way in which the distinction is
    conventionally drawn between speech and song. Thus musical notation leads us to a realm of sound,
    writing to the words behind the sound. But if speech and song are fundamentally indistinguish-
    able, then the same must be true of writing and notation. While a discussion of this issue is beyond
    the scope of the present chapter, it does have important implications as regards the history of writing.
    For if the distinction between writing and musical notation, like that between speech and song, has
    arisen in the course of history, we cannot assume that it has been there from the start. Any history
    of writing, therefore, must be a history of notation as well.

3   I take this idea from the linguistic philosophy of Maurice Merleau-Ponty. 'Strictly speaking', Merleau-
    Ponty writes, 'there are no conventional signs, . . . there are only words into which the history of
    a whole language has been compressed, and which effect communication with no absolute guar-
    antee, dogged as they are by incredible linguistic hazards' (1962: 188). We find in the writings of
    Emile Durkheim an apparent precedent for this appreciation of the way word meanings are freighted
    with the sedimentations of the past. In their making, Durkheim argued, 'a multitude of minds have
    associated, united and combined their ideas and sentiments; for them, long generations have accu-
    mulated their experience and their knowledge' (1976[1915]: 16). Yet despite the superficial similarity,
    these thinkers were poles apart in their conclusions. What for Merleau-Ponty is hazardous and
    uncertain had, for Durkheim, all the certainty of pre-established and unquestioned tradition. The
    history that Merleau-Ponty identifies with the ongoing current of speech itself was reified, in
    Durkheim's conception, as an object – an already completed past – that weighs down upon the
    individual in the name of society.

4   See Bourdieu (1977: 94) and Ingold (1986b: 94) for closely comparable arguments regarding the
    anthropological derivation of 'culture' from observations of practice, and Chapter Twenty-one (pp.
    382–3) for the parallel derivation, in biology, of the genotype.

5   Edmund Carpenter makes a similar point in a study of the relation between speaking, thinking and
    carving among the Aivilik Eskimo (Inuit) of Southampton Island. There is, in Eskimo speech, no
    separation of prose and poetry: 'all Eskimo speech has a musical quality and for heightened emotional
    expressions the speaker moves easily into song' (Carpenter 1966: 212).

6   The terms are Heidegger's; for an excellent discussion of how he uses them, see Dreyfus (1991:
    Ch. 4); see also Chapter Nine (pp. 168–9).

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Index

Environmentality

Community, Intimate Government, and the Making of Environmental Subjects in Kumaon, India[1]

by Arun Agrawal

This paper examines how and for what reasons rural residents come to care about the environment. Focusing on Kumaon, India, it explores the deep and durable relationship between government and subjectivity and shows how regulatory strategies associated with and resulting from community decision making help transform those who participate in government. Using evidence drawn from the archival record and fieldwork conducted over two time periods, it analyzes the extent to which varying levels of involvement in institutional regimes of environmental regulation facilitate new ways of understanding the environment. On the basis of this analysis, it outlines a framework of understanding that permits the joint consideration of the technologies of power and self that are responsible for the emergence of new political subjects.

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Down the street an ambulance has come to rescue an old man who is slowly losing his life. Not many can see that he is already becoming the backyard tree he has tended for years.. . .
— JOY HARJO, *How We Become Humans*

On my first visit to Kumaon in northern India in 1985, I met a number of leaders of the widely known Chipko movement, including Sundar Lal Bahuguna and Chandi Prasad Bhatt.[2] The meeting that left a longer-lasting impression, however, was to occur in a small village, Kotuli, where I spent nearly a week investigating how villagers used their forests. Hukam Singh, a young man with a serious air, told me that it was futile to try to save forests. Too many villagers cut too many trees. Too many others did not care. He himself was no exception. "What does it matter if all these trees are cut? There is always more forest." In fact, he judged that at best only a few villagers might be interested in what I was calling "the environment." "Women are the worst. With a small hatchet, they can chop so many branches you will not believe." He qualified this somewhat: "Not because they want to, but they have to feed animals, get firewood to cook."

Hukam Singh's judgment is probably less important for what it says about processes of environmental conservation in Kotuli than for what it reflects of his own position. Talking with other people, I realized that the long periods Hukam Singh spent in the town of Almora prevented him from appreciating fully the efforts afoot to protect trees and forests—the most visible face of the environment in Kumaon. He was trying to get a job in the Almora district court and had stopped farming some of the family agricultural holdings. The meetings that the forest council called almost every other month were not just a sham. The 85 acres of village forest were more densely populated with trees and vegetation than several neighboring forests. Despite the numerous occasions when the village guard caught people illegally cutting tree branches or grazing animals, most villagers did not think of the forest as a freely available public good that could be used at will.

The reasons my conversations with Hukam Singh had a more lasting effect than those with the well-known Chipko leaders were to become apparent during my return visits to Kotuli. I visited again in 1989–90 and in the summer of 1993. In these intervening years, Hukam Singh had left Almora, settled in Kotuli, and married Sailadevi from the nearby village of Gunth. He had started cultivating his plots of irrigated land and bought several cattle. He had also become a member of Kotuli's forest council. One of his uncles, a member of the council, had retired, and Hukam Singh had replaced him. More surprising, Hukam Singh had become a convert to environmental conservation. Sitting on a woven cot, one

2. For a recent careful study of the Chipko movement, its leadership, and its strategies, see Rangan (2000). See Mawdsley (1998) for thoughtful reflection on how Chipko has become an idiom in conservationist arguments.

sturdy leg tapping the ground impatiently, he explained one afternoon, "We protect our forests better than government can. We have to. Government employees don't really have any interest in forests. It is a job for them. For us, it is life." Feeling that he had not made his point sufficiently convincingly, he went on. "Just think of all the things we get from forests—fodder, wood, furniture, food, manure, soil, water, clean air. If we don't safeguard the forest, who else will? Some of the people in the village are ignorant, and so they don't look after the forest. But sooner or later, they will all realize that this is very important work. It is important even for the country, not just for our village."

These different justifications of his personal transformation into someone who cared about protecting trees and situated his actions within a general framework of conservation are too resonant with prevailing environmentalist rhetorics to sound original. But to dismiss them because they are being repeated by many others would be to miss completely the enormously interesting, complex, and crucial but understudied relationship between changes in government and related shifts in environmental practices and beliefs.[3] It would not be wrong to say that the shift in Hukam's beliefs hints at what is perhaps the most important and underexplored question in relation to enviromental regulation. When and for what reason do socially situated actors come to care about, act in relation to, and think about their actions in terms of something they identify as "the environment"?

My paper attempts to fill this gap. It explores the deep and durable relationship between government and subjecthood and shows how regulatory strategies associated with and resulting from community decision making help transform those who participate in government. Using evidence drawn from archival records and fieldwork conducted in 1989–90 and 1993, the paper examines the extent to which varying levels of involvement in institutional regimes of environmental regulation lead to new ways of understanding the world. In the process it helps explain transformations over time and differences at a given point in time in how people view their relationship with the environment.[4]

Hukam Singh did not care much about the village forest in 1985 but by 1993 had come to defend the need for its regulation. Similarly, concern for the environment in Kumaon has grown over time. Widespread involvement in specific regulatory practices is tightly linked with the

emergence of greater concern for the environment and the creation of "environmental subjects"—people who care about the environment. For these people the environment is a conceptual category that organizes some of their thinking and a domain in conscious relation to which they perform some of their actions. I draw on evidence related to forests as an example of an environmental resource. Further, in considering an actor as an environmental subject I do not demand a purist's version of the environment as necessarily separate from and independent of concerns about material interests, livelihoods, and everyday practices of use and consumption. A desire to protect commonly owned/managed trees and forests, even with the recognition that such protection could enhance one's material self-interest, can be part of an environmental subjectivity. In such situations, self-interest comes to be cognized and realized in terms of the environment.

If the environmental aspect of "environmental subjects" requires what Donald Moore (personal communication, 1998) calls "boundary work," so does the second part of the phrase. It should be evident that I do not use "subjects" in opposition either to citizens or to objects. One commonsense meaning of "subjects" would be "actors" or "agents." But when subjected, people are also subordinated—a second way of thinking about the subject. And the third obvious referent of the term is the notion of a theme or domain, as in the environment's being the subject of my research. I use the idea of subjects to think about Kumaon's residents and changes in their ways of looking at, thinking about, and acting in forested environments in part because of the productive ambiguities associated with it. Each of its referents is important, but this paper focuses on the continuum between the meanings of subject as agent or subordinate rather than the legal-juridical meanings associated with Mamdani's (1996) work or the idea of subject that is roughly equivalent with the notion of a theme.

Given the existence of environmental subjects in Kumaon, what is it that distinguishes them from those who continue not to care about or act in relation to the environment? Of the various residents of Kotuli, only some have changed their beliefs about the need for forest protection. Some remain unaffected by changing regulations, and others harvest forest products without attending to or caring about locally formulated enforcement. Thus, to say that Kumaonis have come to care about their forests and the environment is only to suggest that some of them—in increasing numbers over the past few decades perhaps—have done so.

Answers to questions about who acts and thinks about the environment as a relevant referential category when, how, and why are important for both practical and theoretical reasons. Depending on the degree to which individuals care about the environment, the ease with which they agree to contribute to environmental protection may be greater and the costs of enforcing new environmental regulations may be lower. But equally important is the theoretical puzzle: What makes certain kinds of subjects, and what is the best way to understand

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3. For a distinction between "government" and "governance," see Rose (1999: chap. 1). "Government," as used in this paper, refers to the different mechanisms used to shape the conduct of specific persons and groups, including the mechanisms that such persons and groups use on themselves. "Governance" is more directly tied to the functioning of state apparatuses and refers to the regulatory strategies deployed formally by states with regard to their citizens (see Rhodes 1996).

4. For some important work that begins this kind of analysis, see Agarwal (1992), Blake (1999), Bryant (2002), Li (2000), Luke (1999), and Sivaramakrishnan (1999). Relatively few political ecologists or ecofeminists attend to the issues explored in this paper (see Escobar 1999 and Warren 1997).

the relationship between actions and subjectivities? Against the common presumption that actions follow beliefs, this paper will present some evidence that people often first come to act in response to what they may see as compulsion or as their short-term interest and only then develop beliefs that defend short-term-oriented actions on other grounds as well. It will also show that residents of Kumaon vary in their beliefs about forest protection and that these variations are related to their involvement in regulatory practices rather than their social-structural location in terms of caste or gender.

My argument is that beliefs and thoughts are formulated in response to experiences and outcomes over many of which any single agent has little control. There is little doubt that one can change some aspects of the world with which one is in direct interaction, but equally certainly the number and types of forces that affect even one's daily experiences transcend one's own will and design. Much of what one encounters in the world results only partly from strategies reflecting one's own knowledge and preferences. At any given moment, people may plan to act in accordance with their beliefs. But all plans are incomplete and imperfect, and none incorporate the entire contextual structure in which actions lead to consequences. For these and other reasons, actions have unanticipated outcomes. The experience of these unanticipated outcomes does not always confirm actors in their beliefs; some of these outcomes may demonstrate that those beliefs are inappropriate or that earlier subject positions need revision. In these situations, actors have an incentive to work on their beliefs, preferences, and actions, incorporating into their mentalities new propensities to act and think about the world. Even if only a very small proportion of one's daily experience serves to undermine existing beliefs, over a relatively short period (such as a year or two) there may be ample opportunity to arrive at subject positions that are quite different from those held earlier. In this way of thinking about subject positions, the durability of subjectivity or the notion of subjectivity as the seat of consciousness is what is being contested.

In part, I view such opening up and questioning of the idea of durable and sovereign subject positions as a way to facilitate a conversation among scholars who are often concerned with similar analytical and theoretical questions but use different terms—preferences, identity, subjectivity—to signal their common object of concern. Thus, despite the major theoretical differences among economists, sociologists and anthropologists, and poststructuralists, they often refer to similar empirical phenomena when, for example, they assert that "preferences emerge from interactions between individuals and their environment" (Druckman and Lupia 2000:1), speak of the role of anthropologists in the "construction of Chumash identity and tradition" (Haley and Wilcoxon 1997: 761), or suggest that "human subjectivity is socially elaborated" (Cronick 2002:534). By pointing to these potentially fruitful areas of overlap I do not intend to deny the real differences among those who use particular terms to signal their specific theoretical allegiances.

Rather, my aim is to indicate common concerns across disciplinary divisions, show how different terms are deployed in different disciplines to refer to common concerns about the making of subjects, and foreground some skepticism about the possibility of access to a deep subjectivity. An ethnographer's observations, conversations, interviews, and surveys are ways of opening a window and throwing light on how people think, act, imagine, or believe at any given moment and how their ways of doing and being change over time. Investigators—indeed, even close friends and family members—can deduce internal states of mind only from external evidence. There is no direct access to inner thoughts or subject positions.[5]

In any event, persuasive answers about variations between subject positions and the making of subjects are likely to hinge on explanations that systematically connect policy with perceptions, government with subjectivity, institutions with identities. Environmental practice, this paper suggests, is the key link between the regulatory rule that government is all about and imaginations that characterize particular subjects. In contrast, social identities such as gender and caste may play only a small role in shaping beliefs about what one considers to be appropriate environmental actions. This should not be surprising. Although the politics and analytics of identity consider significant the external signs of belonging, it is the tissue of contingent practices spanning categorical affiliations that is really at stake in influencing interests and outcomes. In the subsequent discussion, I hope to sketch the direction in which analysis needs to move.

Producing Subjects

The description of my meetings and conversations with Hukam Singh, although it seems to be located quite firmly in an argument about the emergence of new subjectivities in relation to the environment, resembles Geertz's idea of "a note in a bottle." It comes from "somewhere else," is empirical rather than a philosopher's "thought experiment," and yet has only a passing relationship to representativeness (Greenblatt 1999: 14–16). Making it connect better with a social ground and with other roughly similar stories requires the development of some crucial terms and the presentation of additional evidence. Two such terms are "imagination" and "resistance."

In his seminal account of nationalism's origins, Anderson famously suggests that the nation is an imagined community (1991 [1983]). In a virtuoso performance, he strings together historical vignettes about the development of nationalisms in Russia, England, and Japan in the nineteenth century (pp. 83–111) to show how these cases offered models that could successfully be pirated by other states where "the ruling classes or leading el-

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5. In this regard, see also Sen's (1973) brilliant demonstration of the fatal tensions in operationalizing the preference-revelation mechanisms so beloved of behavioral economists.

ements in them felt threatened by the world-wide spread of the nationally-imagined community" (p. 99). The model that according to Anderson comes to triumph is that of "official nationalism."[6] He suggests (p. 110) that official nationalisms were

> *responses* by power groups . . . [who were] threat-ened with exclusion from, or marginalization in, popularly imagined communities. . . . Such official nationalisms were conservative, not to say reaction-ary, *policies*. . . . very similar policies were pursued by the same sorts of groups in the vast Asian and African territories subjected in the course of the nineteenth century. . . . they were [also] picked up and imitated by indigenous ruling groups in those few zones (among them Japan and Siam) which es-caped direct subjection.

It is interesting, even disturbing, that for Anderson the successful adoption, superimposition, and spread of of-ficial nationalisms as a substitute for popular national-isms lay well within the capacities of ruling groups to accomplish, despite the imagined nature of nationalism. A number of scholars have imaginatively elaborated on the term "imagination" in talking about the nation (Ap-padurai 1996:114–15; Chakrabarty 2000a:chap. 6), but in *Imagined Communities* itself the subsequent analysis gives it relatively short shrift. The successful imposition of an official version of nationalism around the globe, coupled with the imagined quality of national emergence that is the core of Anderson's intervention, implies that power groups were able to colonize the very imagination of the masses over whom they sought to continue to rule. How they overcame, even for a few decades and certainly only patchily, the resistance that existing senses of "imagined belonging" posed to their efforts re-quires further elaboration than Anderson provides. The politics at the level of the subject that is likely involved in the struggle between official and popular nationalisms remains to be compellingly articulated.[7] National sub-jects (to use shorthand to refer to the colonization of political imagination by official nationalizing policies) emerged in history. A history of nationalism therefore requires a politics of the subject.[8]

The question when, why, and how some subjects rather than others come to have an environmental con-

sciousness is precisely what Anderson leaves out in con-sidering the nation. Analogous judgments about the transformation of the consciousness of those who are less powerful can also be found in the work of other scholars. According to Barrington Moore, "People are ev-idently inclined to grant legitimacy to anything that is or seems inevitable no matter how painful it may be. Otherwise the pain might be intolerable" (1978:459). One might ask, "All people?" If not all, then surely we are forced to ask which ones, when, why, and how. The same motivation to account for social and political ac-quiescence impels Gaventa's (1982) brilliant study of power and quiescence in Appalachia, but his analysis of the third face of power can be supplemented by the ex-amination of mechanisms that would explain when and how it is that some people come to accept the interests of dominant classes as their own *and others do not.*

In contrast to Anderson, for whom the imagination of the less powerful subject is smoothly appropriable by of-ficial policies, scholars of resistance have often assumed the opposite. For them, resisting subjects are able to pro-tect their consciousness from the colonizing effects of elite policies, dominant cultures, and hegemonic ideolo-gies. This ground truth forms both their starting assump-tion and their object of demonstration. Scott's path-break-ing study of peasant resistance (1985), his more general reflections on the relationship between domination and resistance (1989), and the work on resistance that emerged as a cross-disciplinary subfield in the wake of his inter-ventions have helped make familiar the idea that people can resist state policies, elite power, and dominant ide-ologies. Scott assertively advances the thesis that the weak probably always withstand the powerful, at least in the realm of ideas and beliefs. He also suggests that when their autonomous views about the prevailing social order are invisible it is because of material constraints and fear of reprisals upon discovery, not because they have come wholeheartedly to acquiesce in their own domination, let alone because their consciousness has been incorporated into a hegemonic ideology.

Scott articulates this position most fully, but a similar understanding of peasants and their interests was also part of early efforts of subaltern-studies scholars to iden-tify an autonomous consciousness for the excluded agents of history.[9] Ranajit Guha's (1982a) seminal state-ment on the historiography of colonial India, for exam-ple, in calling for a more serious consideration of the "politics of the people," portrays the subaltern as "au-tonomous" and subaltern politics as structurally and qualitatively different from elite politics in that "vast areas in the life and consciousness of the people were never integrated into [bourgeois] hegemony" (pp. 4–6; see also Guha 1997). Even those who note that the opposi-tion between domination and resistance is too mechan-

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6. Anderson borrows the term from Seton-Watson but gives it a bite all his own (p. 86)

7. It is precisely to this politics that Chakrabarty (2000a), indebted no doubt in important ways to Chatterjee (1986, 1993), draws at-tention when he seeks to "make visible the heterogeneous practices of seeing" that often go under the name of imagination. Chakra-barty examines the differences among the many ways of imagining the nation by talking about peasants and a literate middle class.

8. The inattention to this politics in Anderson's account is signaled, of course, at the very beginning of his cultural analysis of nation-alism. After defining the nation as "an imagined political com-munity—and imagined as both inherently limited and sovereign" (1991[1983]:6–7), he closely examines every term in the definition except "political." It is not only Anderson's history of nationalism that can be enriched by attending to the politics of subjecthood but also his view of culture more generally.

9. The essays in Guha and Spivak (1988) are among the best intro-ductory texts about subaltern studies. See Guha (1982b, 1997), and Chatterjee and Jeganathan (2000) for a sense of the different mo-ments in the life of a collective. Ludden's (2001) collection of papers constitutes a fine example of some of the more careful critical engagements with the work of subaltern-studies writers.

ical to capture how the consciousness of those subject to power changes with their experience of power go on to note that the process is "murky" (Comaroff and Comaroff 1989:269, 290). But for scholars of resistance and subalternity, the autonomous consciousness of peasants, the subaltern, and other marginalized groups endures in the face of dominant elite pressures operating in a spectrum of domains, not just in the domain of policy.[10]

It is clear that the works discussed above constitute two facets of the puzzle of the relationship between government and subjectivity. Each facet is a strong argument in favor of a particular tendency: in the one one case, the tendency toward the colonization of the imagination by powerful political agents and in the other the tendency toward durability of a sovereign consciousness founded upon the bedrock of individual or class interest. Within themselves, these arguments are at least consistent, but considered jointly as a potential guide to the relationship between the subject and the social they lead to conflicting conclusions. It is crucial not just to account for the persistence of a certain conception of interests within a group of people or to assume the straightforward transformation of one conception of interests into another but to explore more fully the mechanisms that can account for both (and other) possible effects on people's conceptions of their interests.

I weave a path through the opposed conclusions of these two different streams of scholarship by suggesting that technologies of government produce their effects by generating a politics of the subject that can be better understood and analyzed by considering both practice and imagination as critical.[11] The reliance on imagination by some scholars (Appadurai 1996, Chakrabarty 2000*a*) in thinking about the emergence of different kinds of subjects is a step in the right direction. But closer attention to social practices can lead to a species of theorizing more closely connected to the social ground in which imagination is always born and, reciprocally, that it often influences. A direct examination of the heterogeneous practices that policy produces and their relationship with varying social locations has the potential to lead analysis toward the mechanisms involved in producing differences in the way subjects imagine themselves. My interest is to highlight how it might be possible and why it is necessary to politicize both community and imagination in the search for a better way to think about environmental politics.

Foucault's insights on the "subject" form a crucial point of reference but also a point of departure in considering the political that is silenced in Anderson's vision of the imagined community. In *Discipline and Punish*,

Foucault elaborates a particular model of subject making—the panopticon—which facilitates the application of power in the form of a gaze. "He who is subjected to a field of visibility, and who knows it, assumes responsibility for the constraints of power; he makes them play spontaneously upon himself; he inscribes in himself the power relation in which he simultaneously plays both roles; he becomes the principle of his own subjection" (1979 [1975]:202–3). Here then is a mechanism—the gaze—that acts as a sorting device. Those subject to the gaze become subject to power, examples of the effects it can produce. Those who escape the gaze also, presumably, escape the effects of power.

Although this example introduces political practice into the process by which subjects make themselves, it obviously will not do. By itself, the model needs more work for any number of reasons, among them its absence even in total institutions and the infeasibility of applying its principles outside such institutions.[12] Nor is it the case that visibility in asymmetric political relationships necessarily produces subjects who make themselves in ways desired by the gaze of power. Foucault does not elaborate on the specific mechanisms implicated in the making of subjects (Butler 1997:2). He does, however, refer to the indeterminacy that is inherent in the process because modern forms of power and mechanisms of repression do not yield predictable outcomes (1978*a*:115).

Thus, he argues in *Discipline and Punish* that "it would be wrong to say that the soul is an illusion, or an ideological effect. On the contrary, it exists, it has a reality, it is produced permanently around, on, within the body by the functioning of a power that is exercised on those punished—and, in a more general way, on those one supervises, trains and corrects . . . " (1979 [1975]: 27). But his studies (1978*b*, 1980) of Pierre Riviere and Hercule Barbin are about how these persons mobilized counterdiscourses against dominant scientific accounts of their transgressions and crimes. He makes the point clearly in his discussion of different technologies that shape humans. There are "technologies of power, which determine the conduct of individuals and submit them to certain ends or domination, [leading to] an objectivizing of the subject; and technologies of the self, which permit individuals to effect . . . a certain number of operations on their own bodies and souls, thoughts, conduct, and ways of being, so as to transform themselves . . ."(1988:18). In his own attempts to trace how subjects make themselves, Foucault is especially attentive to the practices related to ethical norms in late antiquity, the confessional, and the pastorate; however, the specific institutional and political arrangements that shape practice and subjectivity vary both over time and in space. Foucault explicitly recognizes the many different ways in which subjects come into being (2000 [1979], 2000 [1982]). Much of the vast secondary literature on neoliberal governmentality, in contrast, defers a consider-

10. At the same time, it is fair to observe that more recent scholarship in a subalternist mode has begun to use more seriously Foucault's ideas about power and subject formation and to examine how different kinds of subjects come into being both under colonialism and in modernity (Arnold 1993, Chakrabarty 2000*b*, Prakash 2000).

11. For an attractive recent account of environmentalist history, forces of modernization, and changing imaginaries, see Gold and Gujar (2002).

12. By "total institutions" I mean what Foucault (1979 [1975]:263) calls "complete and austere institutions"; prisons, concentration camps, and insane asylums are prime examples.

ation of how subjects make themselves, focusing primarily on technologies of power aimed at objectifying individuals.[13]

The same observation applies to many of those who extend Foucault's ideas about governmentality to the colonial and postcolonial contexts, remaining preoccupied mostly with the coercive aspects of state, institutional, and social power (Ferguson 1994 [1990], Gupta 1998, Scott 1995, Pels 1997; cf. Bryant 2002). Even in works that focus on the conscious reshaping of the self by the use of technologies of the self, however, there is relatively little attention to variations in self formation and accounting for such variations in terms of social practice—the main focus of the ensuing discussion. In particular, writings in the field of development and environmental conservation, even when influenced by Foucault and Bourdieu, have been relatively inattentive to the variable ways in which self formation takes place and how it may be shaped by involvement in different forms of practice (cf. Blake 1999).

I use the term "environmentality" here to denote a framework of understanding in which technologies of self and power are involved in the creation of new subjects concerned about the environment. There is always a gap between efforts by subjects to fashion themselves anew and the technologies of power that institutional designs seek to consolidate. The realization of particular environmental subjectivities that takes place within this gap is as contingent as it is political. Indeed, it is the recognition of contingency that makes it possible to introduce the register of the political in thinking about the creation of the subject. It is also precisely what Appadurai (1996:134) has in mind when he suggests that colonial technologies left an indelible mark on Indian political consciousness but that there is no easy generalization about how and to what extent they "made inroads into the practical consciousness of colonial subjects in India." Among the dimensions he mentions as important are gender, distance from the colonial gaze, involvement with various policies, and distance from the bureaucratic apparatus.[14]

These factors are of course important. Nonetheless, it is necessary to distinguish between the politics generated by involvement in different kinds of practices and the politics that depends on stable interests presumed to flow from belonging to particular identity categories (Lave et al. 1992, Willis 1981). Much analysis of social phenomena takes interests as naturally given by particular social groupings: ethnic formations, gendered divisions, class-based stratification, caste categories, and so

forth. Imputing interests in this fashion to members of a particular group is common to streams of scholarship that are often seen as belonging to opposed camps (Bates 1981, Ferguson 1994 [1990]). But doing so is highly problematic when one wants to investigate how people come to hold particular views about themselves and how their conceptions of their interests change.

Categorization of persons on the basis of an externally observable difference plays down the way subjects make themselves and overlooks the effects that subjects' actions have on their senses of themselves. Using social identities as the basis for analysis may be useful as a first step, a sort of gross attempt to make sense of the bewildering array of beliefs that people hold and the actions they undertake. To end analysis there, however, is to fail to attend to the many different ways in which people constitute themselves, arrive at new conceptions of what is in their interest, and do so differently over time.[15]

To say that people's interests change so as to take into account environmental protection is not to suggest that conflicting desires for personal gain, defined potentially in as many ways as there are subjects, no longer exist or that interests do not matter. Instead, it is to insist on the mutability of conceptions of interests and subjects' practices.[16] To use an imperfect analogy, it is to think of subjectivity as a palimpsest on which involvement in institutionalized practices inscribes new and sometimes conflicting understandings of what is in one's interest over and over again. Social and environmental practice as it emerges under differing institutional and political circumstances is, therefore, a critical mediating concept in my account of the connections between context and subjectivity.[17] Under changing social conditions and institutions, identity categories as guides to a person's interests make sense only to the extent that they prevent, facilitate, or compel practice.

Focusing attention on specific social practices relevant to subject formation along a given dimension or facet of identity creates the opportunity for learning more about how actions affect ways of thinking about the world and produce new subjects.[18] Undoubtedly, practices are al-

13. See, for example, Luke (1999), most of the essays in Barry, Osborne, and Rose (1996), and the vast majority of the essays on governmentality-related papers in the journal *Economy and Society*. Among the exceptions are Dean (1994, 1995) and Rimke (2000). See also Rose's extensive work on psychology (1989, 1998).
14. See also Dean (1999), Hacking (1986), and the essays in Burchell, Gordon, and Miller (1991). Poovey (1995) provides a closely argued account of the relationship among policy, institutions, changes in practices, and the formation of class and culture.

15. For insightful studies that illustrate the difficulty of reading interests from identity categories, see Carney (1993) and Schroeder (1999). Robbins (2000) shows how the intersection of caste and gender influences environmental management.
16. As Bourdieu says, "the concept of interest as I construe it has nothing in common with the naturalistic, trans-historical, and universal interest of utilitarian theory. . . . Interest is a historical arbitrary, a historical construction that can be known only through historical analysis, *ex post*, through empirical observation and not deduced a priori" (Wacquant 1989:41–42).
17. Some useful introductions to the large literature on practice and identity can be found in Mouffe (1995), Perry and Maurer (2003), and Quashie (2004). The insights of the Birmingham School are especially relevant here. For a useful review and introduction see Lave et al. (1992).
18. My thinking on this subject has been significantly influenced by feminist work on the materiality of the body, in which the body is understood "as neither a biological nor a sociological category, but rather the point of overlap between the physical, the symbolic, and the material social conditions" (Braidotti 2003:44). See also Butler (1993) for a provocative discussion of the materiality of the body.

ways undertaken in the context of institutionalized structures of expectations and obligations, asymmetric political relations, and the views that people have of themselves. But to point to the situatedness of practices and beliefs is not to grant social context an unambiguous influence on practice or practice a similar control over subjectivity. Rather, it is to ground the relationship between context, practice, and subjectivity in evidence and investigative possibilities. It is simultaneously to refuse to accept the common social-scientific practice of using identity categories or a combination of such categories to infer people's interests.

Variations in Environmental Subjectivities in Kumaon

This paper considers two forms of variations in environmental subjectivities in Kumaon—those that have unfolded over time and those that are geographically distributed. The first set of changes is that by which Kumaonis, formerly persons who opposed efforts to protect the forested environment, became persons who undertook the task of protection themselves. Instead of protesting the governmentalization of nature, Kumaonis became active partners in that governmentalization (Agrawal 2001, Sarin 2002). I describe below the alchemical shift in interest, beliefs, and actions for which the move toward community partially stands. Equally important to understand, however, are the contemporary differences in environmental practices and beliefs among Kumaonis and their effect on the costs of environmental regulation.

My examination of changes over time and contemporary social-spatial variations in the way Kumaon's residents see themselves and their forests draws on three bodies of evidence. The first comes from archival materials about Kumaonis' actions in forests in the first three decades of the twentieth century and a survey of forest council headmen in the early 1990s, 60 years after forest council regulations became the basis for local forest-related practices. The second body of evidence comes from two rounds of interviews I conducted with 35 Kumaon residents in seven villages, the first in 1989 and the second in 1993.[19] Of the seven villages, four had formed councils in the years between 1989 and 1993. Both in 1989 and 1993, I asked my respondents approximately 40 structured and unstructured questions about their socioeconomic status, modes of participation in the use and government of forests, views about forests, and relationships with other villagers and Forest and Revenue Department officials. The responses to some of the questions can be presented quantitatively. In the discussion below, I report the quantitative information in tabular form and offer extended extracts from my in-

formants' responses to provide texture to the inferences that .the evidence in the tables facilitates. The third body of evidence comes from 244 surveys I carried out in 1993 in 46 villages. These villages included those I had visited in 1989, and 38 of them had forest councils. In the remaining 8 villages, villagers' relationship to environmental enforcement was restricted to infrequent interactions with Forest Department guards, seen only irregularly in the forests that villagers used. (Villagers prefer not to see Forest Department guards, but they prefer even more that the guards not see them!)

I use different sources of evidence in part of necessity. What I wish to understand and explain is how the subject positions of Kumaonis about their forests have changed, and since it is impossible to go back in time to gain direct testimony from them, the archival record is a useful substitute. Statements by colonial officials about the actions of Kumaon's villagers serve as the basis for inferences about what might have motivated these actions. They need some interpretive care, since both Revenue and Forest Department officials likely wrote so as to portray their departments in the most favorable light possible. Finally, since the archival record provides information about both ordinary villagers and their leaders, I used fieldwork to gain information from both these types of residents in contemporary Kumaon.

A second reason to use different sources in combination—quantitative data and detailed verbal responses—is to triangulate across my findings from these different sources. Quantitative data provide information on how the understandings of a large number of my respondents have changed in the aggregate. It is therefore extremely useful to indicate changes in a summary fashion and to take into account even those respondents whose answers do not match my expected findings. But quantitative information is less reliable as an index to the mental state of specific individuals. It may be true that even when actions and words of individuals are observed at length and over a long time period they cannot reveal the "truth" about subject positions, but more detailed observations *can* facilitate a more reliable sense or at least more reasonable inferences about individual subjectivities. Reliance on a combination of sources allows me to make general inferences about transformations in subjectivities over long periods of time, make more specific arguments about such changes over short periods, and, finally, construct preliminary arguments about the relationship between subjectivities and institutionalized practices versus identity categories.

HISTORICAL CHANGES IN ENVIRONMENTAL SUBJECTIVITIES

Hukam Singh's personal example illustrates what has obviously been a much larger and more comprehensive process of social environmental change in Kumaon. A number of studies have outlined the acts of rebellion of Kumaon's hill people at the beginning of the twentieth century in response to the British colonial state's efforts to constrain and close access to forests (Sarin 2002, Shri-

19. During my first visit, I had talked with a total of 43 villagers. I could not meet and talk with 8 on them in 1993 for a variety of reasons; several had moved out of the village, several could not be located, and 1 had died.

vastava 1996). Between 1904 and 1917 more than 3,000 square miles of forest were transferred to the Imperial Forest Department in greater Kumaon (KFGC 1921), of which nearly 1,000 square miles were located in the Nainital, Almora, and Pithoragarh Districts.[20] Even earlier, the colonial state had made inroads into the area of forests under the control of local communities, but these latest incursions raised the special ire of the villagers. Their grievances were particularly acute because of new rules that specified strict restrictions on lopping and grazing rights, restricted the use of nontimber forest products, prohibited the extension of cultivation, increased the amount of labor extracted from the villagers, and augmented the number of forest guards. The last raised the level of friction between forest guards and the village women who harvested products from the forest.

Unwilling, often because they were unable, to accede to the demands made by the colonial Forest Department, Kumaonis ignored the new rules that limited their activities in forests that the state claimed as its own. They also protested more actively, often simply by continuing to do what they had done before the passage of new regulations. They grazed their animals, cut trees, and set fires in forests that had been classified as reserved. Forest Department officials found it next to impossible to enforce the restrictive rules in the areas they had tried to turn officially into forests.

Law enforcement was especially difficult because of the unwillingness of villagers to cooperate with Forest Department officials. The department staff was small, the area it sought to police was immense, and the supervisory burden was onerous. Decrying the lopping for fodder by villagers and the difficulty of apprehending those who cut fodder, E. C. Allen, the deputy commissioner of Garhwal, wrote to the commissioner of Kumaon, "Such loppings are seldom detected at once and the offenders are still more seldom caught red-handed, the patrol with his present enormous beat being probably 10 miles away at the time . . . . It is very difficult to bring an offence, perhaps discovered a week or more after its occurrence, home to any particular village much less individual" (1904:9). Demarcation of the forest boundaries, prevention of fires, and implementation of working plans meant an impossibly heavy workload for Forest Department guards and employees even in the absence of villager protests. When the number of protests was high and villagers set fires often, the normal tasks of foresters could become impossible to perform. One Forest Department official was told by the deputy commissioner of Kumaon that "the present intensive management of the forest department cannot continue without importation into Kumaon of regular police" (Turner 1924).

After the stricter controls of 1893, the settlement officer, J. E. Goudge (1901:10), wrote about how difficult it was to detect offenders in instances of firing:

In the vast area of forests under protection by the district authorities the difficulty of preventing fires and of punishing offenders who wilfully fire for grazing is due to the expense of any system of fire protection. Where forests are unprotected by firelines, and there is no special patrol agency during the dangerous season, it is next to impossible to find out who the offenders are and to determine whether the fire is caused by negligence, accident, or intention.

In a similar vein, the Forest Administration Report of the United Provinces in 1923 said about a fire in the valley of the Pindar River (Review 1924:266): "During the year, the inhabitants of the Pindar valley showed their appreciation of the leniency granted by Government after the 1921 fire outbreak, when a number of fire cases were dropped, by burning some of the fire protected areas which had escaped in 1921. . . . These fires are known to be due to direct incitement by the non-cooperating fraternity." The sarcasm is clumsily wielded, but its import is obvious: villagers could not be trusted because ungratefulness was their response to leniency. Other annual reports of the Forest Department from around this period provide similar claims about the lack of cooperation from villagers, the irresponsibility of villagers, and the inadvisability of any attempt to cooperate with them to achieve protectionist goals. At the same time, some state officials underlined the importance of cooperation from villagers. Percy Wyndham, asked to assess the impact of forest settlements, said in 1916, "It must be remembered that in the tracts administration is largely dependent on the goodwill of the people and the personal influence of the officials [on the people]" (quoted in Baumann 1995:84).

Other reports reveal continuing difficulties in apprehending those who broke rules to shape forest use and management. Names of people who set fires could not be obtained. Even more unfortunate from the Forest Department's point of view, it was not only the ordinary people but also the heads of villages, *padhans*, who were unreliable. Many village heads were paid by the colonial state and were often expected to carry out the work of revenue collection. Their defiance, therefore, was even more a cause for alarm. As early as 1904 the deputy commissioner of Almora, C. A. Sherring, remarked on the heavy work that *patwaris* performed for the Forest Department and argued in favor of increasing their number substantially because the *padhans* were unreliable (1904: 2):[21]

It is certain that very little assistance can be expected from the padhans, who are in my experience only too often the leaders of the village in the com-

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20. Since I completed my fieldwork, the districts of Almora and Pithoragarh have had two new districts carved out of them: Bageshwar and Champawat.

21. *Patwaris* constituted the lowest rung of the revenue administration hierarchy in colonial Kumaon and typically oversaw land revenue collection for anywhere up to 30 villages, depending on the size of the village and the distances involved. They continue to be critical to revenue administration and play an important role in the collection of statistics, calling village households to account for minor infractions of official rules, whether related to agriculture or to forestry.

mission of offences and in the shielding of offenders. . . . If the control of open civil forest is to be anything more than nominal we really must have the full complement of patwaris. . . . A large forest staff of foresters and guards is also required.

The deputy conservator of forests similarly complained that villagers refused to reveal the culprit in investigations concerning forest-related offences: "It is far too common an occurrence for wholesale damage to be done by some particular village. . . . Often nothing approaching the proof required for conviction can be obtained. . . . There is too much of this popular form of wanton destruction, the whole village subsequently combining to screen the offenders" (Burke 1911:44, quoted in Shrivastava 1996:185). These reports and complaints by colonial officials in Kumaon make clear the enormous difficulties the Forest Department faced in realizing its ambition to control villagers' actions on land made into forest. The collective actions of villagers in setting fires and lopping trees and their unwillingness to become informants against their "fraternity" indicate the strands of solidarity that connected them in their work against the colonial state. With unreliable villagers, limited resources, and few trained staff, it is not surprising that the Forest Department found it hard to rely only on those processes of forest making that it had initiated and implemented in other parts of India—processes that relied mainly on exclusion of people, demarcation of landscapes, creation of new restrictions, and fines and imprisonment.[22]

The response of the state, in the shape of an agreement with Kumaon residents to create community-managed forests, was an uneasy collaboration among the Revenue Department, foresters, and villagers (Shrivastava 1996, Agrawal 2001). It appointed the Kumaon Forest Grievances Committee to look into complaints by Kumaonis against the Forest Department and on the basis of the committee's recommendations passed new rules to facilitate the formal creation of village-based forest councils that could govern local forests. Over the next 60 years more than 3,000 new councils came into being in Kumaon. The Revenue Department has created new officials who supervise the functioning of these councils. Annual reports detail the progress in creation of councils, their income from sales of timber and resin, and the extent to which this form of government has found acceptance in Kumaon's villages.

The birth of a new form of regulatory rule has been accompanied by shifts in how Kumaon's villagers today regard forests, trees, and the environment. Some indication of the extent to which contemporary Kumaonis have changed in their beliefs, not just their actions, about

22. The inability of the state to protect property in the face of concerted resistance is of course not a feature of peasant collective action in Kumaon alone. The threat to established relations of use and livelihood that the new regulations posed is similar to the threat that new technologies and new institutions have posed in other regions. For example, the invention of mechanized implements has often sparked such responses from peasants and agrarian labor and found some success precisely because of the inability of the state machinery to detect rule violations (Adas 1981).

forest regulation is evident from the results of a survey of forest council headmen I conducted in 1993. The council headmen in Kumaon have come to occupy an intermediate place in the regulatory apparatus for the environment. On the one hand, they are the instruments of environment-related regulatory authority. On the other, they represent villagers' interests in forests. The greatest proportion of responses concerns the inadequate enforcement support they get from Forest and Revenue Department officials. The government of forests at the level of the community is hampered by the unwillingness or inability of state officials to buttress attempts by villagers to prevent rule infractions. A rough calculation shows that nearly two-thirds of the responses are directly related to headmen's concerns about the importance of and difficulties in enforcing regulatory rule. Admittedly, the council headmen are the persons most likely to be concerned about forests and the environment among all the residents of Kumaon. But the point to note is that even when presented with an opportunity to voice the problems that they face and potential ways of addressing them, only a very small proportion of the responses from the headmen are complaints about the lack of remuneration (row 8). The headmen evidently put their own material interests aside as they tried to grapple with the question of the problems that characterize government by communities.

The figures in the table are no more than an abstract, numerical summation of many specific statements that the survey also elicited. The common themes in these statements call for a tabular representation, but the sentiments behind the numbers come from actual words. "I have tried to give up being the head of our committee so many times. But even those who don't agree with me don't want me to leave," observed one of the headmen. Another said, "I have given years of my life to patrolling the forest. Yes. There were days when my own fields had a ripening crop [and needed a watchman]. I am losing my eyesight from straining to look in the dark of the jungle. And my knees can no longer support my steps as I walk in the forest. But I keep going because I worry that the forest will no longer survive if I retire." Sukh Mohan's views about the making and maintenance of his village's forests focus on his personal contribution. One might even discount some of what he and the other headmen say as hyperbole—rhetoric inflating the contribution they actually make. But what is more interesting is that this rhetoric in favor of forest protection matches objectives that the Forest Department began pursuing nearly 150 years ago. Puran Ram gave a reason for his conservationist practice: "We suffered a lot from not having too many trees in our forest. Our women didn't have even enough wood to cook. But after we banned cattle and goats from the forest, it has come back. Now we don't even have to keep a full-time guard. Villagers are becoming more aware." Many other forest council headmen concurred. Some of the more striking statements included "If we want to get sweet fruit, we first have to plant trees" and "The side of the mountain is held together by the roots of the trees we plant and

grow. Without the forest, the whole village would slide into the mouth of the river."[23]

Puran Ram and Hukam Singh both thus expressed a hope for a connection between their efforts to conserve the forest and the actions of other villagers. This common hope, which I encountered in other conversations as well, is an important indication of the relationship between actions and subject positions. It signals that in many of the villages a new form of government frames and enacts reasonable guidelines for villagers' practices in the expectation that over time practice will lead to new subjectivities, new ways to regard the forest. Villagers may be forced to follow council regulations in the short run, but over time they will come to see that stinting is in their own interest. The forest belongs to the collective defined as the village, and when an individual harvests resources illegally the action adversely affects all members of the collective. The examples of both Puran Ram and Hukam Singh, as indeed those of more than two-thirds of the headmen in my survey, suggest that the expectation is not just a fantasy.

The differences in the voice and tenor of archival and more recent statements I collected offer a basis for the judgment that the practices and views of many of Kumaon's residents about their forests have changed substantially. Some of these changes reflect a greater interest in careful use of forest products, a greater willingness to abide by regulations, and a stronger desire to call upon state officials to help protect trees in comparison with the past. These changes in subjectivities have occurred since the passage of the Forest Council Rules in 1931. Partly responsible for these changes is the idea that Kumaonis can consider the region's forests their own once again. I do not report statements and actions of the same individual persons who lived in the early 1900s, but a systematic change seems to have occurred in the forest-related practices and beliefs of individuals belonging to the same social class and status over the time period in question.[24] Within the shift in ownership by the collective, there are of course many variations. Not all villagers have come to see Kumaon's forests as their own. Variations in their beliefs about forests and in their practices around regulation of forest protection are not, however, directly connected to the benefits they receive from forests. Benefits from forests are formally equitably allocated, and this equitable allocation is reflected in the actual harvests by most villagers (Agrawal 2001, Shrivastava 1996). But even within villages there is significant variation in how villagers see forests and protect them.

23. For a quantitative analysis of the data from the survey, see Agrawal and Yadama (1997).
24. I have reported statements and actions by various persons as being representative of the groups to which they belong, a common strategy for scholars belonging to fields as different in their assumptions as cultural anthropologists and rational-choice political scientists. See Bates (1981) and Bates, Figueredo, and Weingast (1998) as rational-choice exemplars of this strategy and Ferguson (1994 [1990]) and Gupta (1998) as counterpart examples from cultural anthropology.

It may be argued that appropriations by the colonial state in the early twentieth century drove a wedge between forests and villagers. Subsequently, the rules that led to community-owned and community-managed forests reaffirmed the propriety and legality of villagers' possession of forests. They recognized that villagers have a stake in what happens to forests and expressed some faith in their ability, especially with guidance, to take reasonable measures for their protection. These institutional changes go together with changes in villagers' actions and beliefs about forests. One way to explain this change in villagers' actions and beliefs is to suggest that the observed shift in policy and the subsequent changes in beliefs and actions are unrelated—that they are sufficiently separated in time that a causal connection can only tenuously be drawn. This is frankly unsatisfactory. At best it is a strategy of denial. A more careful argument would at least suggest that shifts in villagers' actions and statements in the later part of the twentieth century are no more than a response to the changes in ownership that the new policy produced. The transfer of large areas of land to villagers in the form of community forests has created in them a greater concern to protect the forests and care for vegetation that they control.

This is an important part of the explanation. It usefully suggests that the way social groups perceive their interests is significantly dependent on policy and regulation instead of being constant and immutable. But it is still inadequate in two ways. It collapses the distinction between the interests of a group as perceived by an observer-analyst and the actions and beliefs of members of that group. In this explanation, interests, actions, and beliefs of all group members are of a piece, and any changes in them take place all at once. This assertion of an identity among various aspects of what makes a subject and the simultaneity of change in all of these aspects is at best a difficult proposition to swallow. We often arrive at a new sense of what is in our interest but continue to hold contradictory beliefs and act in ways that better match the historical sense of our interests. Many of the headmen whom I interviewed in Kumaon or who became part of my survey were trying to enforce rules that they knew were not in the interests of their own households. Their wives and children were often apprehended by the forest guards they appointed. Yet, they defended their actions in the name of the collective need to protect forests and expressed the hope that over time villagers would come around to their view and change their practices in forests. As the next section makes clear, their hopes were not in vain. Many villagers proved susceptible to these shifting strategies of government.

A second problem with the explanation that headmen care for forests because they have the right to manage them is that it confuses the private interests and actions of the headmen with their public office and interests. The forests that have been transferred to village communities are managed by collective bodies of anywhere between 20 and 200 village households represented by the forest councils and their headmen (Sarin 2002). To attribute a collective interest to these bodies and explain

what the headmen of these councils say in terms of that interest is to elide all distinctions between specific individual actors and the organizations they lead. A more intimate and careful exploration of other actors in Kumaon who are involved in the local use and protection of forests is necessary. Only then can we begin to make sense of the changes indicated by the survey of headmen summarized in table 1 and the information below about the beliefs of Kumaonis about their forested environments.

RECENT CHANGES IN ENVIRONMENTAL SUBJECTIVITIES

When I went to Kumaon and Garhwal in 1989, I traveled there as a student interested in environmental institutions and their effects on the actions and beliefs of their members. My main interest was to show that environmental institutions—the forest councils—had a significant mediating impact on the condition of forests. Not all villages had created local institutions to govern their forests. Of the 13 that I visited, only 6 had forest councils. The ones that did differed in the means they used to protect and guard forests. Since my interest was primarily to understand institutional effects on forests, I focused on gathering archival data from records created and maintained locally by village councils. My conversations with village residents were aimed chiefly at gaining a sense of their views about forests and the benefits they provided. I found that villagers who had forest councils were typically more interested in forest protection. They tried to defend their forests against harvesting pressures from other residents within the same village but especially from those who did not live in their village. They also stated clear justifications of the need to protect forests, even if their efforts were not always successful. In one village near the border between Almora and Nainital Districts, a villager used the heavy monsoons to make the point:[25]

> Do you see this rain? Do you see the crops in the fields? The rain can destroy the standing crop. But even if the weather was good, thieves can destroy the crop if there are no guards. It is the same with the forest. You plant a shrub, you give it water, you take care of it. But if you don't protect it, cattle can eat it. The forest is for us, but we have to take care of it, if we want it to be there for us.

Another villager in a council meeting I attended pointed to the difficulties of enforcement:[26]

> Until we get maps, legal recognition, and marked boundaries [of the local forest], council cannot work properly. People from Dhar [a neighboring village] tell us that the forest is theirs. We cannot enter it. So we can guard part of the forest, and we don't know which part [to guard]. Since 1984 when the

TABLE 1

*Complaints by Forest Council Headmen (*n = 324*) in Kumaon, 1993*

Complaints Mentioned by Headmen (in Order of Frequency)	Number of Headmen Listing the Complaint
1. Inadequate support from Forest and Revenue Department officials	203 (.63)
2. Limited powers of council officials for environmental enforcement	185 (.57)
3. Insufficient resources in forests for the needs of village residents	141 (.44)
4. Low income of the council	130 (.40)
5. Inadequate demarcation of council-governed forests	61 (.19)
6. Lack of respect for the authority of the council among villagers	42 (.13)
7. Land encroachment on council-managed forests	36 (.11)
8. Lack of remuneration for headmen	31 (.10)
9. Other (e.g., incorrect mapping of forest boundaries, length of court cases, violation of rules by residents of other villages, too much interference in the day-to-day working of the council, lack of information about forest council rules)	64 (.20)

NOTE: Figures in parentheses indicate the proportion of headmen mentioning that complaint. Each headman could list up to three complaints.

panchayat was formed, we have been requesting the papers that show the proper limits so we can manage properly, protect our forest. But what can one do if the government does not even provide us the necessary papers?

A second villager in the same meeting added, "Mister, this is Kaljug.[27] No one listens to authority. So we must get support from the forest officers and revenue officers to make sure that no one just chops down whatever he wants."

Residents of the seven villages that did not have forest councils scarcely attempted any environmental regulation—no doubt in significant part because the forests around their village were owned and managed by either the Forest Department or the Revenue Department. Villagers perceived regulation as the responsibility of the state and as a constraint on their actions in the forest—gathering firewood, grazing animals, harvesting trees and nontimber forest produce, and collecting fodder. There were therefore clear differences between the actions and statements of villagers who had created forest councils and brought local forests under their control and those

25. Interview #2 with Shankar Ram, translated by Kiran Asher.
26. Interview #13 with Bachi Singh, translated by Kiran Asher.

27. In Indian mythology, Kaljug is the fourth and the final era before time resumes again to process through the same sequence of eras: Satjug, Treta, Dwapar, and then Kaljug. It is the time when *dharma*—action according to norms—gives way to *adharma*—action in violation of norms—and established authority fails.

TABLE 2
Changing Beliefs of Villagers about the Environment, 1989–93

Presence/Absence of Forest Council in 1993 and Year of Interview	Number of Respondents	Degree of Agreement on Forest Protection[a]	Number Giving Economic versus Other Reasons for Forest Protection		Degree of Willingness to Reduce Consumption of Forest Products
			Economic	Other	
Present					
1989	20	2.35	16	4	1.45
1993	20	3.65	12	8	3.00
Absent					
1989	15	2.47	11	4	1.73
1993	15	2.27	12	3	1.87

NOTE: Changes in degree of agreement on forest protection and degree of willingness to reduce consumption of forest products in the villages that had forest councils in 1993 are statistically significant: for forest protection, $\chi^2 = 14.03$, d.f. $= 4$, $p < .005$; for reduction of consumption, $\chi^2 = 15.05$. d.f $= 4$, $p < .005$.
[a]Responses scored on a scale of 1 (low) to 5 (high).

of villagers who relied on state-controlled forests to satisfy their requirements for fodder and firewood.

During my return visit in 1993 I realized that four of the seven villages (Pokhri, Tangnua, Toli, and Nanauli) that had lacked forest councils in 1989 had formed their own councils in the intervening years. They had drafted constitutions modeled on others in the region and used the provisions of the Forest Council Rules to bring under their control the local forests that had earlier been managed by the Revenue Department. A series of resolutions by the new councils prescribed how (and how often) to hold meetings, when to elect new officials, the basis for allocating fodder and grazing benefits, the levels of payments by villagers in exchange for the right to use forests, monitoring practices in relation to the forests' condition and use, and ways to sanction rule breakers. Exposure to these new institutional constraints, council members hoped, would lead villagers to more conservationist practices in the forest. Many households in fact had begun sending members to council meetings. In two of the villages, households regularly participated in patrolling the forest. In three of them they were restricting the amount of fodder and firewood that was harvested, the number of animals that were grazed, and the incidence of illegal entry into the forest by outsiders. In one village the council had stopped a long-standing case of encroachment on the government land that had become community forest.

In the four villages with new forest councils, I had talked with 20 residents in 1989. At that time their statements had not suggested that they felt any pressing need for conserving the environment. Little had distinguished their actions and views from those of the 15 residents with whom I had talked in the other three villages (Darman, Gogta, and Barora). The three questions for which their responses can be summarized are as follows:

1. Do you agree with the statement "Forests should be protected"? Please indicate the extent of your agreement by using any number between 1 and 5, where 1 indicates a low degree of agreement and 5 indicates strong agreement.

2. If forests are to be protected, should they be protected for economic reasons or for other noneconomic benefits they provide, including cleaner air, soil conservation, and water retention?

3. Do you agree with the statement "To protect forests, my family and I are willing to reduce our consumption of resources from the local forests"? Please indicate the extent of your agreement by using any number between 1 and 5, where 1 indicates a low degree of agreement and 5 indicates strong agreement.[28]

The figures in table 2 indicate that the differences among the residents of the seven villages in 1989 were relatively minor. All villagers expressed limited agreement with the idea that forests should be protected; their reasons were mainly economic, and they were relatively unwilling to place any constraints on the consumption of their families to ensure forest conservation. Although there was little basis for differentiating among the responses of the two sets of villagers in 1989, changes became evident in 1993 when I talked again with the same villagers. In the case of the four villages that had created forest councils, the differences were obvious both in their actions and in what they said about forests and the environment. Some of them had come to participate actively in their new forest councils, and a few had limited their use of the village forest. Some acted as guards, and some even reported on neighbors who had broken the

28. The form in which I posed these three questions may have increased the likelihood of responses indicating the desire to protect forests. My interest, however, is less in presenting a representative picture of the extent of environmental awareness in Kumaon than in showing how the desire to protect forests changes over time and how it is related to practice versus identity categories such as caste and gender. I have not identified any reasons that there would be a bias in favor of overreporting of environmental awareness that would be systematically related to the passage of time or to different identity categories.

council's rules. The similarities in their changed behavior and the changed behavior of the forest council headmen that I briefly described above are quite striking. Those who had come to have forest councils in their villages or, perhaps more accurate, those whose councils had come to have them, had begun to view their and others' actions in forests in a way that valorized protection of trees and economy in the use of forest products.

Of course, there were others in these four villages who had not changed much. Those with whom I talked were especially likely to continue to say and do the same things as in 1989 if they had not participated in any way in the formation of the forest councils or in the suite of strategies used by forest councils to try to protect forests. If they had become involved in the efforts to create a council or protect the forest that came to be managed by the council, they were far more likely to suggest that the forest required protection. They were also more likely to say that they were willing to be personally invested in protection. This is certainly not to claim that participation in council activities is a magic bullet that necessarily leads to transformation of subject positions. And yet, the testimony of these 20 residents, by no means a representative sample in a statistical sense, constitutes a valuable window on how beliefs change for those who come to be involved in practices of environmental regulation (see table 2).

Residents in the four villages with forest councils expressed greater agreement with the idea of forest protection and greater willingness to reduce their own consumption of forest products from local forests in 1993 than in 1989. They explained that reducing consumption of firewood and fodder from council-managed forests typically meant the exercise of even greater care in use, the substitution of agricultural waste for fodder, using pressure cookers or improved stoves, and in some instances shifting harvesting activities to government-owned forest. Of the 20 individuals, 13 had participated in monitoring or enforcement of forest council rules in some form, and the shifts in their environmental beliefs turned out to be stronger than for those who had not become involved in any forest-council-initiated action.

The example of Nanauli is useful for elaborating on some of the points that table 2 summarily conveys. A lower-caste woman (Sukhi Devi), a lower-caste man (Ramji), and two upper-caste men (Hari Singh and Govind Joshi) were my four respondents in Nanauli. In 1989 they were only mildly in agreement with the idea of protecting forests; they equated such protection with limits on their family's welfare and capitulation to the demands of the Forest Department. Sukhi Devi said that she was not sure her actions would have any effect. Ramji refused even to accept that the condition of the village forest was the responsibility of villagers. Hari Singh, prefacing his comments with a curse against external meddling in village affairs (a sentiment from which I was unsure that I was excluded), began counting on his fingers the reasons not to do anything about the forest: "Fires in the forest are natural. If the forest is closed to grazing, what will village animals eat? Even if villagers in Nanauli stop cutting trees, those living in other villages will not stop.

The near-vertical slopes in many parts of the forest mean that it is naturally protected. The Forest Department already has a guard in place. Villagers do not have time to waste." He would have gone on but for the interruption from Govind Joshi: "Leave it alone, Hari. Agrawalji gets the idea."[29]

When I returned in 1993, I encountered quite a different situation. The newly formed forest council for Nanauli had been talking to villagers about the importance of looking to the future, and villagers had started paying a small amount to the council for the grass and firewood they extracted from the forest. The council had appointed a full-time guard who was paid out of villagers' contributions. The council was holding 10–15 meetings a year, mostly clustered together during the monsoon months. And Ramji, who had served a six-month stint as the forest guard, seemed deeply committed to the forest council and its goals. When I reminded him of my previous visit and conversation, he overcame his earlier reluctance to dismiss Hari Singh's opinions of four years ago. "You know, some people watch and others do. When there was talk of making a council, I was one of the first to realize how much it would benefit our village. Hariji has much education, a lot of land, many trees on that land. He does not need the council forest. No wonder he doesn't see any reason to help with the forest." Although Hari Singh was not involved in any direct monitoring or enforcement activities, he *was* one of the seven council members and was making his contributions toward the salary of the village guard on time. When I asked whether he was willing to reduce his use of forest products to protect trees, he almost snapped at me, "Am I not already paying for the guard, and [thereby] reducing my family's income? Do you want to skin me alive to save the trees?"[30] His shortness could easily have been the result of a struggle he was likely waging within himself—on the one hand helping guard the forest and on other wondering if it was necessary. Of the four persons with whom I had talked in 1989, Sukhi Devi was the least oriented toward forest protection. She was poor and had fallen behind on the contribution each village household was making toward guard salaries. For her, the council with its talk of forest protection was yet another imposition among the many that made her life difficult. As I sat with her and one of my research assistants in front of her leaky thatched hut, she slowly said, "I have grown old, seen many changes. I don't know if we need all these meetings and guards and fines. We were doing fine. All this new talk of saving trees makes my head spin."[31]

These different responses contain important clues about the relationship between social-environmental practices, redefinition of a subject's interests, and formation of new subjectivities. As individuals undertake new actions, often as a result of resolutions adopted by

29. Interviews #17, 18, 19, and 20 with Ramji, Govind Joshi, Hari Singh, and Sukhi Devi, translated by Ranjit Singh.
30. Interviews #17a and 19a with Ramji and Hari Singh, translated by Ranjit Singh.
31. Interview #20a with Sukhi Devi, translated by Ranjit Singh.
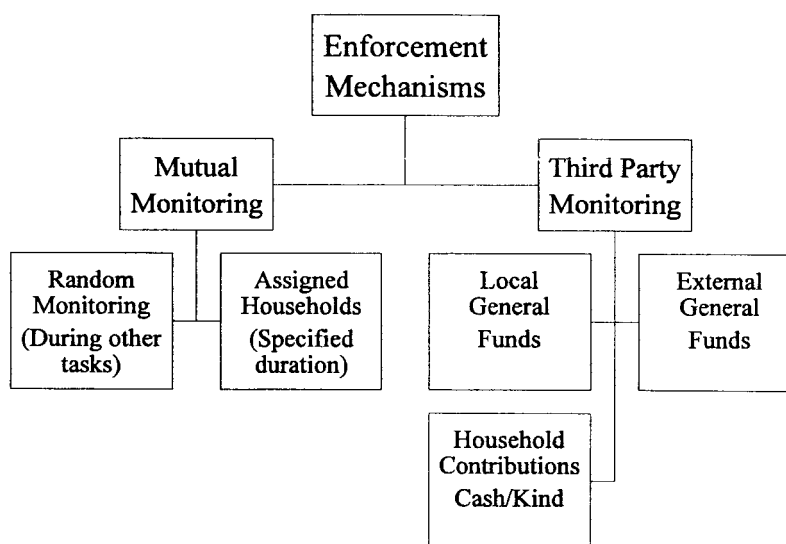
FIG. 1. *Types of monitoring mechanisms in Kumaon forest councils.*

their village's forest council, they have to define their own position in relation to these resolutions and the changes in practices that they necessitate. Their efforts to come to a new understanding of what constitutes their best interest in the context of new institutional arrangements and new knowledge about the limits of available resources must entail significant internal struggles. If Ramji spends months trying to apprehend rule violators, walking around the forest, being held accountable for unauthorized grazing and felling, and being paid for his efforts, it is understandable that he has begun thinking of his interests and subjectivity in relation to these practices rather than in terms of his caste or gender. Similarly, if Govind Joshi and Hari Singh are contributing toward protection, they have to move some mental furniture around to accommodate actions involving them in forest protection. If Sukhi Devi does not engage in activities that orient her to think about what she does in the forest except to view it as a source of material benefits, it is not surprising that her gender or caste does not make her a defender of the forest. Socially defined identity categories are a poor predictor of interests precisely because they objectify and homogenize their members, ignoring the very real lives that people live in the shadow of their social identities. Imputing a common set of interests to all those who belong to a particular identity category is only a convenient analytical tool. More complex theorizing in this vein—relating caste and gender or caste, gender, and class to interests, for example—is subject to the same critique.

The information from interviews in these four villages is especially useful in comparison with the 15 interviews in the three villages where no councils had emerged in the intervening years. In these villages, where I also conducted a second round of interviews in 1993, there had been little change in the environment-related practices

of local residents. They still regarded the idea of protecting local forests as a waste of time and the presence of Forest Department guards as a veritable curse. Many of them, usually after looking around to make sure no officials were present, roundly abused the Forest Department. Indeed, this is a practice that villagers in other parts of rural India may also find a terrifying pleasure. But even when my interviewees agreed that it was necessary to protect tree because of their benefits, they were unwilling to do anything themselves toward such a goal. For the most part, their positions regarding forests and the environment had changed little.

VARIATIONS IN ENVIRONMENTAL SUBJECTIVITIES: THE PLACE OF REGULATION

The environmental practices and perceptions associated with the emergence of forest councils in Kumaon contain many variations. The preceding discussion, despite its important clues to sources of variation, is based on highly aggregated information. To examine how and to what extent regulatory practices, in contrast to structural-categorical signs of belonging such as caste and gender, relate to the environmental imaginations of Kumaonis, I report on the responses of more than 200 persons I met and interviewed in 1993. The larger number of people makes it possible to examine how different forms of monitoring and enforcement relate to respondents' beliefs about the environment.

The forest councils in Kumaon depend for enforcement on monitoring by residents themselves or by third parties (fig. 1). Under one form of mutual monitoring, any villager can monitor any of the others and report illegal actions in the forest to the council. Under the other, households are assigned monitoring duties in turn. There is little specialization in the task of monitoring

and monitors are not paid for their work. In contrast, third-party monitoring involves the appointment of a specialized monitor who serves for a specific period and is paid for the work performed. Forms of third-party monitoring are distinguished by the mode of payment: direct payments by households in cash or in kind, salary payments by the council from funds raised locally, and salary payments from funds made available through sale of forest products or transfers from the state. Table 3 summarizes the responses for different forms of monitoring and shows the extent to which participation in monitoring and enforcement is connected to respondents' beliefs about forests and the environment.

For all forms of monitoring, respondents expressed a greater desire to protect forests if they participated in monitoring than if they did not, but the difference between participants and nonparticipants is more striking as monitoring becomes more specialized and villagers participate directly in enforcement. Where monitoring is a specialized role for assigned households or for assigned individuals paid from villagers' own funds, participation in monitoring is positively related to both a greater appreciation of the need to protect the environment and a greater willingness to undergo some limits on personal consumption to protect the environment. Conversations with villagers over several months in summer 1993 fleshed out the details of this statistical pattern and indicated the close relationship between social-ecological practices and environmental subject positions. In Pokhri the forest council was relatively new, and its officials had experimented with a number of different strategies of monitoring and enforcement. The ten households constituting the village had finally settled

upon mutual monitoring whereby each household was assigned monitoring duties in weekly rotation. As a result, all village households took part in patrolling, reporting, and discussions associated with monitoring, even if only once every ten weeks. The women I met in Pokhri, usually the persons charged with cooking, collecting firewood, and fetching water, were far more likely to report on their neighbors' activities in the forest, say that they wanted to conserve the forest, and describe how they drove other villagers or their animals from their forest than those of the nearby village of Kurchon, where villagers paid their guard out of funds that the Revenue Department sent them as their share of the resin sales from their forest.[32] Ishwari Devi, an upper-caste woman in Pokhri, explained, "Kurchon's people have it easy. They get so much money for their pine resin from the Forest [Department], they don't have to worry about how to pay their guard. But unless you have stayed up in the night to save your crops, you don't love your fields."[33] Bachiram Bhatt repeated her point about the relationship between work and psychological orientation in a slightly different way when he said that his own daily activities had been affected little by his council or its attempts at

32. Many forest councils with large forests that have mature pine trees entrust the Forest Department with the work of tapping the trees for resin. The Forest Department channels back nearly 80% of the sale proceeds of the resin it harvests, and this can be a substantial sum for the councils. The Kurchon council received an annual average of nearly 800 rupees from the department (approximately US$30 according to exchange rates prevailing at the time of fieldwork). In contrast, the residents of Pokhri raised just 200 rupees a year to pay their guard.
33. Interview #140a with Ishwari Devi, translated by Ranjit Singh.

TABLE 3
Participation and Belief among Villagers, 1993

Monitoring Strategy and Participation	Number of Respondents	Degree of Agreement on Forest Protection[a]	Number Giving Economic versus Other Reasons for Forest Protection		Degree of Willingness to Reduce Consumption of Forest Products[a]
			Economic	Other	
Mutual					
All (random)					
Participant	8	3.25	4	4	2.63
Nonparticipant	2	3.00	2	0	2.00
Rotation					
Participant	12	4.25	4	8	3.42
Nonparticipant	5	2.80	4	1	2.40
Third-party					
Paid by household					
Participant	32	4.00	20	12	3.06
Nonparticipant	7	2.86	6	1	2.29
Paid with local funds					
Participant	55	3.98	36	19	2.80
Nonparticipant	43	2.81	38	5	1.72
Paid with external funds					
Participant	9	3.66	6	3	2.66
Nonparticipant	32	2.31	30	2	1.53

[a]Responses scored on a scale of 1 (low) to 5 (high).

TABLE 4
Gender, Caste, Participation, and Belief

Dimension of Difference	Number of Respondents	Degree of Agreement on Forest Protection[a]	Number Giving Economic versus Other Reasons for Forest Protection		Degree of Willingness to Reduce Consumption of Forest Products[a]
			Economic	Other	
Gender					
Women	95	3.38	69	26	2.45
Men	110	3.36	80	30	2.34
Caste					
High	106	3.44	78	28	2.44
Low	99	3.30	71	28	2.42
Participation					
Yes	116	3.92	70	46	2.97
No	89	2.66	79	10	1.74

[a]Responses scored on a scale from 1 (low) to 5 (high).

forest protection and enforcement. "The council holds only three meetings in a year and the business is over quickly because we don't have to worry about how to pay the guard," he said.[34] The larger number of households in Kurchon also likely means that few people are involved with forest protection in a direct way. These various conversations with villagers revealed no clear relationship between gender, caste, and environmental subject positions.

These conversations suggest that the difference between those who participate in monitoring and those who do not is greatest for the forms of monitoring in which there is role specialization and villagers directly invest labor or money in monitoring. It also shows that the choice of monitoring by a forest council does not affect all villagers in the same manner. It is the villagers who take direct part in monitoring or in funding monitoring activities who express greater interest in forest protection. These villagers are also more invested than nonparticipants in seeing forest protection as an important goal even if they do not expect immediate economic benefits. The responses of nonparticipants in each type of monitoring are closer to those of villagers who do not have a forest council in their village at all. The clear implication is that practices that involve villagers more directly and closely in managing forests and protecting them are associated with a greater desire to protect the environment. Further, it is in villages with the highest participation in monitoring and enforcement that councils have the greatest ability to raise resources to protect forests. Both in villages where the most basic form of mutual monitoring is in force and in those where resources for monitoring are primarily secured from outside sources, the ability of the council to gain participation is more limited.

This evidence does not permit the inference of a

34. Interview #167a with Bachiram Bhatt, translated by Ranjit Singh.

causal-sequential relationship between participation in monitoring and the development of environmental subjectivities. Such an inference would be possible only if one were to interview the same respondents before and after their participation in enforcement. The combination of archival data with the survey of headmen reported in table 1 and the information in table 2 comes closest to such before-and-after evidence. The figures in table 3 show only variations in subjectivities across different forms of monitoring. It may be reasonable to suggest that it is differences in beliefs that prompt my respondents to participate in monitoring rather than participation that leads them to different beliefs. It is when we consider the archival evidence and the information in table 2 and 3 together that it becomes at all justifiable to suggest that variations in the environmental identities of Kumaon residents are systematically related to their participation in environmental enforcement and that these differences stem at least to some extent from such participation.

The importance of participation in different monitoring mechanisms becomes evident also in comparison with social identity categories such as gender and caste. Table 4 shows the difference between environment-related beliefs of villagers interviewed by their gender (women versus men), caste (high versus low), and participation in different forms of monitoring. There is relatively little difference between men and women or higher- and lower-caste respondents; they seem equally (un)likely to want to protect forests or reduce their own household's consumption to conserve forests. The absence of a close connection between social identity categories such as caste or gender and a predisposition toward environmental protection can be readily explained by the fact that these identities are not systematically tied to involvement in institutionalized practices to patrol the forest or monitor rule compliance or to level of participation in council elections or meetings. If any-

TABLE 5
Contributions per Household Toward Enforcement by Forest Councils

Form of Monitoring	Number of Respondents	Contribution per Household (in Rupees)
Mutual monitoring (each household monitors all others)	10 (2 villages)	9.33
Mutual monitoring (households assigned monitoring duty in rotation)	17 (3 villages)	11.44
Third-party monitoring (households pay monitors directly)	39 (7 villages)	36.61
Third-party monitoring (salary paid out of locally raised funds)	98 (18 villages)	19.98
Third-party monitoring (salary paid out of external transfers)	41 (8 villages)	16.22

thing, women are less likely to be involved in efforts to monitor or govern forests than men. Indeed, the exclusion of women from effective and meaningful participation in environmental decision making and enforcement has been remarked upon by other scholars (Agarwal 2001). Ultimately, it is those who are involved in the activities of their forest councils, contributing materially to environmental enforcement, or directly involved in monitoring and enforcement who are more likely to agree with the need to protect forests, to say that forests need to be protected for environmental rather than economic reasons, and to accept some reduction in their own use so as to ensure forest protection.

Interview responses from villagers again resonate with the numerical estimates in the table. One of Bhagartola's male residents who had been active in his council's meetings and forest protection since the council was formed 50 years ago said,[35]

> I know this forest since the Forest Department took it at the beginning of the first war. They took out all the almond and walnut trees; many of the oak died. Pine is there in two of the [forest] compartments now. But all the forest and trees are ours today. We made our council in year 1933 [*san 90*], as soon as we could. We get fodder and money from our forest, and everyone understands its value. We would not have if the forest had remained with the [Forest] Department.

It is reasonable to conclude that when villagers participate in monitoring and enforcement they come to realize at a personal level the social costs generated by those who do not adhere to the practices and expectations that have been collectively established. They confront those who act illegally in the forest more directly and then must decide whether to enforce the rules, ignore those who violate rules, or join them in violating socially constructed norms and expectations. Choosing

the first option means working to redefine one's interests and subjectivity. Similarly, those whose actions violate collectively generated guidelines to regulate practice can often continue to do so when it is individually expedient and there is no regulatory mechanism in place. But when enforcement is commonplace, rule violators are more often confronted with knowledge of their own deviations and the consequences of deviations. When their actions are met with direct challenges that they consider appropriately advanced (because collectively agreed upon), it becomes far more difficult to continue to act and believe in a deviant manner. It is in examining practices of villagers closely that it thus becomes possible to trace the links between politics, institutional rules, and practices and subject formation.

The effects of more widespread participation are also visible in the resources that councils are able to raise for protecting forests. Table 5 presents the per-household contributions that forest councils are able to deploy annually. The form of monitoring that leads to the highest level of contributions is the one in which households pay the guard directly. Mutual monitoring by households themselves produces the lowest level of contributions. Indeed, councils resort to this form of forest protection when they are unable to gain the agreement of their members to spend sufficient monetary and or material resources on paying a guard for monitoring. The amount shown as "contributions" under third-party monitoring in which the guard is paid from external funds is misleading because these are, strictly speaking, the resources available for monitoring from all sources (including transfers from the government and the sale of forest products), not just the contributions of village households.

Clearly, engagement with the regulatory practices of monitoring and enforcement is positively connected both with the existence of environmental orientations among Kumaon's residents and with higher monetary and material contributions toward enforcement per household. The inference important for policy is that certain forms of environmental enforcement are associated with greater commitment to environmental conservation, higher levels of local involvement, and the generation of environmental subjectivities. The larger

35. Interview #26a with Sujan Singh Negi, translated by Ranjit Singh. Coincidentally, Bhagartola had 70 households in 1993; its residents contributed nearly 45 rupees each toward forest protection and had adopted a system of monitoring in which a specialized guard was paid out of locally raised funds (Agrawal 2001).

point of the discussion is that participation in certain forms of environmental regulation and enforcement generates new conceptions of what constitutes the participants' interest.

Intimate Government

A useful metaphor for thinking about the mechanisms that underpin the production of various forms of subjectivity in Kumaon is what Latour (1987) has called "action at a distance" and, following him, Miller and Rose (1990) have termed "government at a distance." Latour answers how it might be that intentional causes operate at a distance to effect particular kinds of actions in places and by people that are not directly controlled. Examining the work of scientists, Callon and Latour (1981) and Latour (1986) describe the affiliations and networks that help establish links between calculations at one place and actions in another. The crucial element in their argument is the "construction of allied interests through persuasion, intrigue, calculation, or rhetoric" (Miller and Rose 1990:10). It is not that any one of the actors involved appeals to already existing common interests; rather, one set of actors, by deploying a combination of resources, convinces another group that the goals and problems of the two are linked and can be addressed by using joint strategies.[36]

In Kumaon, two crucial types of resources that the Forest and Revenue Departments combined and deployed in the 1920s and '30s were information and forests. Information about the adverse effects of centralized government of forests in Kumaon during the 1910s and about the government of forests by communities in the region prepared the ground for the argument that regulatory control over forests could be decentralized to positive effect. The experience of decentralized government of forests in Burma and Madras and the investigation of these experiences firsthand by departmental officials in the 1920s helped produce the design of the Forest Council Rules of 1931. The gradual return of the same forested lands that villagers had used until the 1890s (which the Kumaon Forest Department had appropriated between 1893 and 1916) provided the material basis for the idea of a common interest in forest protection between village communities and the Forest Department. Forest councils became the institutional means to pursue this common interest over long geographical distances.

In the formulation "action at a distance" or "government at a distance," it is geographical distance that action and government overcome. In an important sense, these formulations are about the uncoupling of geographical distance from social and political distance that forms of modern government accomplish. By clarifying and specifying the relationship between particular practices in forested areas and the sanctions that would follow

those practices, government encourages new kinds of actions among those who are to be governed. Action at a distance thus overcomes the effects of physical separation by creating regulations known to those located at a distance. Officials who oversee the translation of these regulations onto a social ground succeed in their charge because of the presence of a desire among environmental subjects to follow new pathways of practice.

One can well argue that the government of the environment in Kumaon conformed to this logic of action at a distance in its earlier phases, before the institution of community-based government. In this earlier phase, the effort to induce a change in the actions of villagers failed because of the inability of the Forest Department to develop a vision of joint interests in forests with which Kumaonis could identify or to persuade villagers that their practices in the region's forests could complement those of the department. But the forest councils created the potential for villagers and state officials to come together in a new form of government through which a compelling vision of joint interests could be manufactured and new practices jointly pursued. Once the colonial government and Kumaon's villagers had crafted highly dispersed centers of environmental authority, processes of government at a distance came to be supplemented by what might be called "intimate government."[37] Given the widespread recent efforts around the world to institute similar processes of environmental government—joint action by local residents and state departments—it is imperative to attend more closely to the relationship between subjectivity and government.[38]

In contrast to government at a distance, which presupposes centers of calculation, constant oversight, continuous collection of information, unceasing crunching of numbers, and the imposition of intellectual dominance through expertise (Miller and Rose 1990: 9–10), intimate government in Kumaon works by dispersing rule, scattering involvement in government more widely, and encouraging careful reckoning of environmental practices and their consequences among Kumaon's residents. Actors in numerous locations of environmental decision making work in different ways and to different degrees to protect forests. Homogeneity across these locations is difficult to accomplish. Differences among villages in resource endowments, biophysical attributes, social stratification, levels of migration, histories of cooperation, and occupational distribution—to name a few of the relevant factors—make visions of singular control utopian at best. Monitoring of villagers' actions is patchy and unpredictable. Councils collect in-

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36. Miller and Rose (1990) follow this argument closely as they examine how modern government overcomes the diluting effects of distance on the exercise of power.

37. In coining the phrase "intimate government" I acknowledge a debt to Hugh Raffles (2002), who uses the idea of intimate knowledge in talking about indigenous knowledges and their circulation in the corridors of policy making.

38. The exploding literature on decentralization of environmental governance shows just how widespread this phenomenon is. See reviews in Ribot and Larson (2004), Wiley (2002), Agrawal (2004), and FAO (1999). Unfortunately, almost none of these reviews or, indeed, the texts discussed by them attend to changes in environmental subjectivities.

formation, but it is available only locally and seldom processed and presented in a way that might be useful for policy elsewhere. Practice and sociality rather than expertise form the basis of intimate government to regulate villagers' actions. The ability of regulation to make itself felt in the realm of everyday practice depends upon the channeling of existing flows of power within village communities toward new ends related to the environment. The joint production of interests is based on multiple daily interactions within the community. To the extent that these interactions are shaped by councils, they are politically motivated toward greater conservation. In their responses to measures adopted by the councils, villagers undertake their own calculus of potential gains and losses.

As community becomes the referential locus of environmental actions, it also comes to be the arena in which intimate government unfolds. Intimate government shapes practice and helps to knit together individuals in villages, their leaders, state officials stationed in rural administrative centers, and politicians interested in classifying existing ecological practices. Intimate government involves the creation and deployment of links of political influence between a group of decision makers within the village and the ordinary villagers whose practices it seeks to shape. Institutional changes in the exercise of power are the instruments through which these links between decision makers and the practices of villagers are made real. When successful, this process is closely tied to processes of environmental protection, as the evidence in this paper suggests. Variation in institutional forms of enforcement is linked with the participation that villagers are willing to provide and forest council decision makers try to elicit. Specialization of enforcement roles and direct participation in enforcement seem to create the greatest willingness on the part of villagers to contribute to environmental protection. But not all forms of institutional enforcement are equally available to all forest councils. If the number of households in a village is small and the households are relatively poor, the ability of villagers to contribute toward the payment of a guard's salary is limited. If a village is highly stratified or if there are many disagreements among the villagers, they are also less able to enforce environmental regulations sustainably. Indeed, a plethora of local variations shapes the options available to councils. These variations in village-level processes also influence the extent to which different village communities are able to take advantage of the state's willingness to disperse rule and decentralize control over forests.

Intimate government is partly about the reduction of physical and social distance in government as community becomes the locus and source of new regulatory strategies and partly about the ways villagers try to shape their own conduct in forests, what some scholars have termed "self-government" (Dean 1994, Rimke 2000). Intimate government also works among villagers as they come to recognize social and physical limits on the extent and use of forests and begin to accept and defend restrictions that make practice conform to such limits. Government at a distance works in Kumaon only in con-

junction with intimate government in its multiple forms—through the community, through formally crafted local regulation, and as situated within the subjectivity of villagers. With the redefinition of interests that exposure to scarcity and regulation makes explicit, a calculation of the costs and benefits of illegal harvests from their own forests versus those from state-controlled forests or other communities' forests has now come to pervade the environmental practices of households. Instead of simply harvesting the fodder, firewood, or timber they need from forests near their homes, Kumaon's residents now carefully reckon whether, where, how, how much, and when to harvest what they need. Careful reckoning is individually pursued but socially shaped. Experiences of scarcity, initially prompted by the widespread administrative enforcement undertaken in the early twentieth century, make such reckoning unavoidable. Projected into the future, they demonstrate the need to redefine what is in the interest of village households.

Thus, it is not simply constraint that new forms of community-based government embody.[39] Regulations may necessitate careful estimations of availability and scarcity, but they go together with possibilities for other kinds of corrective action against decision makers. If villagers do not approve of the way in which their forest is being governed, they can attempt to change the regulations adopted by their council members or even change the council membership. Even if regulations do not change regularly and frequently, the vulnerability of the council's decision makers to elections and of their decisions to local challenge makes community-based government of the environment very different from government with the Forest Department fully in charge. Channels allow influence to flow in multiple directions rather than only one way. And the everyday regulation of what happens in forests is influenced far more directly by the forest councils than it ever was by state officials in the Forest and Revenue Departments. Villagers now protect forests and control illegal practices of harvesting and extraction. They use the language of regulation and many of the same idioms of protection that state officials deploy, but they do so in pursuit of goals that they imagine as their own and in which they often construct state officials as inefficient, unsupportive, or corrupt. This imagined autonomy, stemming from precisely the practices of conservation encouraged by state officials, is crucial to the success of decentralized protection.

My focus on variations in monitoring practices and subjectivities moves away from the abstract, static categories of social classification based on caste, gender, or territorial location. The many variations in the nature of regulatory practices within villages and within binary

39. Much of the literature on environmental politics that uses an analytic of domination/power and resistance/marginality provides arguments coded by this structural division between freedom and constraint. See, for example, Brosius (1997) and Fairhead and Leach (2000) and, for a contrastive study, Moore (1998). More general studies of domination/resistance are also subject to the same tendency (Kaplan and Kelly 1994, Lichbach 1998).

categories—men and women, upper and lower castes, rich and poor—render such classifications only partially useful at best. Terms such as "cultural forms" and "symbolic systems," central to Paul Willis's penetrating study of the reproduction of the difference between capitalists and workers, seem similarly distant from the process of subject making. Willis is also concerned with questions of the "construction of subjectivities and the confirmation of identity" (1981: 173), but it is in the examination of the actual practices of schooling among "working-class kids" rather than in its abstract cultural-Marxist theoretical structure that his study produces the most compelling insights.

The responses and practices of Kumaon's residents suggest that social categories such as gender and caste are not very useful for understanding subject formation. Indeed, they serve precisely to obscure the processes through which subjects are made. These categories are useful only as proxies, hinting at a small fraction of the interactions that go into the making of environmental subjects. A shift away from categorical relations toward villagers' involvement in practices of socio-ecological regulation helps to uncover how conceptual units of analysis such as politics, institutions, and subjectivities—clearly different concepts in the abstract—are combined in the lives and experiences of Kumaon's villagers. It is in the investigation of the texture of social practice, simplified analytically by a focus on forms of monitoring and enforcement, that it becomes possible to see how environmental politics is lived by those subject to it.

Cultivating Environmental Subjects

The argument that there is a relationship between government and subject formation, between policy and subjectivity (Foucault 1982:212), has been well rehearsed (Cruikshank 1994, Hannah 2000, Mitchell 2000, Rose 1999, Tully 1988). This relationship can be traced especially well by examining the technologies of power that form subjects and encourage them to define themselves in particular ways and the technologies of the self that individuals apply to themselves to transform their own conditions (Miller 1993:xiii–xiv). These two kinds of technologies are joined in the idea of government based on knowledge and visible in the processes that unfolded in the making of environmental subjects in Kumaon.

This paper has chosen not to engage the friction and heat that discussions about Foucault's ethics often generate. Although it is surely important to examine whether his concept of power and subject lead to an inability to criticize social phenomena, what is more interesting for my purposes is the extent to which some of Foucault's later ideas about government and its relationship to subject formation can be investigated on an evidentiary basis in the context of variations in environmental subjecthood

in Kumaon.[40] Foucault is often taken as producing provocative conceptual innovations that cannot be deployed in relation to evidence generated from a social ground. Similarly, much political-philosophical debate on subject formation proceeds as if subjects emerged and existed independent of a historical, political, and social ground. It thus constantly runs the risk of becoming irrelevant to actual processes of subject formation. This paper has undertaken simultaneously to examine Foucault's ideas about subject formation against a social and political context and to think about subject formation concretely rather than abstractly. Although it has simplified the conceptual architecture of philosophical discussions about the subject, it has done so with a view to focusing carefully on a dilemma that confronts much social-theoretical discussion about the making of subjects. More concretely, it has tried to show what differentiates various kinds of subjects by viewing practice as the crucial link between power and imagination, between structure and subjectivity. It is close attention to practice that permits the joint examination of seemingly different abstract constructs such as politics, institutions, and subjectivities.

In this context, Butler's (1997:10) caution against using "subject" interchangeably with "person" or "individual" needs to be taken seriously. Her caution is most useful for its recognition that the relations of power within which subjects are formed are not necessarily the ones they enact after being formed. The temporal sequence she introduces in the relationship between subject formation and power helps underline the fact that the conditions of origins of a subject need have no more than a tenuous impact upon the continuing existence of and actions by that subject.[41] In Kumaon, the production of environmental subjects in the early twentieth century within the Forest Department, one might note, led to a cascade of changes in institutional, political, and social domains connected to the idea of community. It is in this realm of community that new environmental subjects such as Hukam Singh have emerged.

The process of subject formation, implicit in most studies of environmental government, is crucially connected to participation and practice. The practices of enforcement and regulation in which villagers have come

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40. Rorty (1984) complains that Foucault is a cynical observer of the current social order. Dews (1984), calling Foucault a Nietzschean naturalist, asserts that his insights cannot be a substitute for the normative foundations of political critique. According to Fraser (1989:33), Foucault adopts a concept of power that "permits him no condemnation of any objectionable feature of modern societies . . . [but] his rhetoric betrays the conviction that modern societies are utterly without redeeming features." Taylor (1984) advances perhaps the strongest argument in this vein, arguing that Foucault's account of the modern world as a series of hermetically sealed monolithic truth regimes is as far from reality as the blandest Whig perspective of progress (see also Philp 1983). For close and persuasive arguments that engage these critiques of Foucault's ethics and go a long way toward showing their logical and interpretive gaps, see Dreyfus and Rabinow (1983), Miller (1993), and especially Patton (1989), who shows how Foucault's critics misunderstand his use of ideas about power.

41. Butler also emphasizes the linguistic and psychic aspects of the constitution of the subject, not the direct concerns of this paper.

to participate have to do with more careful government of environment and of their own actions and selves. The state's efforts to govern at a distance ultimately made forest councils available to villagers as a new form of government. The recognition of a mutual interest in forests, brought into existence by concessions from the state and experiences of scarcity, led some village communities to constitute themselves formally as forest councils. Simultaneously, the willingness of forest councils to initiate processes of intimate government in their own communities affected the way villagers participate in government and the extent to which they are willing to work upon themselves to become environmental subjects.

Comments

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Perceptions of the environment and responses to the opportunities it offers and the constraints it imposes are an extremely important subject in view of the precarious condition of the environment in most regions of the world. Earlier studies have dealt with environmental movements (Guha 2000), perception (Cowie 2002, Sahlins 1995, Guha 1999, Brun and Kalland 1995, Sorokin 1937–41), adaptation (Gadgil and Malhotra 1979, Gupta 1991, Jodha 1998), and institutions and governance (Prakash 1995, Ramakrishnan et al. 2000). Agrawal makes a useful contribution with regard to the relationship between beliefs, perception, and action. Sen (1980) drew attention to the twin challenges that scholars and policy makers face in describing a phenomenon. Recognizing that any description is partial and guided by prior beliefs and assumptions, one can seek to prescribe a course of action or policy or to predict certain consequences. Agrawal attempts to do both.

The literature on innovation and my experience with creativity at the grass roots in the Honey Bee Network have convinced me that individual agents have substantial autonomy in formulating and implementing their strategies for perceiving and responding to the environment. A contingency framework has merit only to the extent that it allows for inertia and helplessness. Any theory which enables actors (not subjects) to take responsibility for their actions must build upon perceptions of the phenomena that are consistent with their philosophy. Agrawal might have explained that his choice of an aspect of reality to describe was guided by beliefs that he has about the scope for action that remains for actors as distinct from third-party scholars.

The protection of the environment in any region cannot take place without the direct participation of the people who live there. It is true that they have protested, but this has been not so much against the protection of the environment as against the attempt to protect it through exclusion, insularity, and sometimes explicit hostility between the state and the local communities (Guha and Gadgil 1996). It would have been useful in the discussion of the setting of fires in the forest to recall a mid-nineteenth-century debate summarized by Cleghorn in 1848 (Barton 2000). After a review of various views on the subject, Cleghorn tended to see fire as a means of clearing the forest floor and preventing the proliferation of a certain beetle that would otherwise have multiplied in the dead trees left lying on the ground and attacked the healthy ones, leading to a decline in the forest cover. Once this debate is brought into focus, the meanings of many statements quoted by Agrawal become contentious and therefore illuminating. The quotations about what farmers perceive themselves as gaining from conservation are very helpful in making the case for their active participation in governance of the forest. It is evident that institutionalization influences people's intentions and the inferences they draw from their actions. Once the forest councils had been created, a platform for negotiating individual interests became available, and individual concerns converged in some cases and diverged in others. The strength of the paper is in its explanation of the way people began to modify their perceptions of and responses to the need for forest protection. I am not convinced that these changes can be explained solely in terms of the availability of the institutional platform and not also in terms of increased dependence on the public forest. From the point of view of transaction costs, spending more time meeting ex-ante transaction costs such as negotiation or finding suppliers would reduce the ex-post transaction costs of enforcement, monitoring, and conflict resolution. Agrawal could have studied the differences in perceptions between the villages in which councils were formed and the others in much more detail. Decentralization of decision making has been known to improve performance and accountability. Whether or not governments can ever be intimate, I believe that governance can be. It is a useful point that the portfolio of opportunities that villagers have in the given socio-ecological context will help us understand the linkage between access, assurance, abilities, and attitudes vis-à-vis ecological resources, institutions, technology, and culture (Gupta 1989, 1995,2001; Gupta and Sinha 2002).

The conclusion that people form their own self-image in response to the opportunities for negotiating collective understanding of their environment makes sense. Whether this conclusion required the academic excursion into rhetoric and verbosity evident in the early part of the paper is a moot point. The discipline of anthropology will benefit tremendously if respondents are given an opportunity to comment on and critique scholars' findings and interpretations. Parsimony will be an inevitable consequence if precision in describing the perceptions of scholars becomes a norm. If this takes place in the description of the respondents as well, so much the better.

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Subject formation and its relation to larger socio-historical forces have been pressing issues in anthropology. Agrawal offers a provocative theoretical treatment of the way in which subjectivities are not only constituted but transformed. Typically, identity categories such as race, caste, class, and gender are said to produce stable and predictable sets of interests. Agrawal suggests that even scholars who describe shifts in subjectivities, such as Benedict Anderson and Michel Foucault, rarely discuss the specific processes by which this might occur. He argues that investigation of these processes is best accomplished through attention to practices.

Although Agrawal's attention to changing subjectivities is timely and important, his analysis may privilege the end result of a process that is highly socially mediated. In his framework, identity categories are relevant in interest formation "only to the extent that they facilitate or compel practice." In an attempt to understand the impact of such practices as attending group meetings and acting as a forest guard, he compares individuals who belong to forest councils with those who do not. Yet his focus on these particular practices does not account for the mediation of this situation at many levels by the social context. Individual options are powerfully inflected by culturally specific expectations and institutions, and these in turn are shaped by and shape identity categories such as gender, race, caste, and class. Identity categories may or may not intersect with particular practices so that, for example, there may be few differences in beliefs between men and women who participate in forest councils. I suggest, however, that we need to account for the "prehistory" of this situation. Identity categories may critically influence the possibility or the appeal of certain practices to particular groups. This point does not by any means discount Agrawal's approach but suggests that we might look at the particular forces that compel or foster practice in the earlier stages of this socially mediated process.

When we look more closely at the community forest councils that Agrawal discusses, we find that their membership is highly skewed toward men (more than 90% male in some cases) and women's input is systematically marginalized (Agarwal 2002:188; Kant, Singh, and Singh 1991). Poverty also appears to play a major role in unequal rates of participation among villagers, the poor, disproportionately female, being underrepresented. This may be partly because they have a difficult time paying membership dues. Beyond this, those who have no land must rely on the community forest for fuel wood and fodder and are therefore compelled to commit illegal acts. As Agrawal (2001) reports, in some areas of India 90% of those caught for illegal firewood collection are women.

There are structural reasons for these gendered differences. Cultural gender asymmetries account for many of them, and council regulations stipulating that each household can only have one member (who is almost invariably male) not only reinforce but amplify them (Agrawal 2002). Women and children are almost exclusively charged with fuel wood collection and other forms of forest-based work. The vast majority of the material practices required by the ethic of "care" fall on women, among them feeding animals with agricultural "waste" instead of fodder from the community forest, not harvesting wood locally (and walking farther to state forests or neighboring villages), and changing cooking habits (Agrawal 2002). These examples are some of the many practices, often gender-stratified, which constitute part of the "prehistory" of individuals' potential for joining forest councils.

Similarly, there is no singular forest, and we can explore how a range of forests are created through linkages between institutions, identity categories, and practices. As Agrawal shows, changing institutional forms open up new possibilities for villagers' practices. These practices are not predetermined by identity categories, and therefore, as he points out, we cannot adopt Shiva's assumption that low-caste women are "defenders of the forest." Instead, his work points to the historical contingencies produced by changing institutional forms. Identity categories may play a larger role than is acknowledged in his example, but he provides a way to understand that subjects' interests are not fixed and are related to these larger conditions. Changes in these conditions, in turn, provide new terrains which foster some practices and constrain others and offer a critical space for the production of new subjectivities.

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Agrawal's central point is that there is a strong relationship between the institutional design of government policies, the ordinary practices of citizens (or subjects), and the production of particular subjectivities. He seeks to show that environmental conservationist policies of the state are better served through the devolution of control over forestry resources to the "communities" inhabiting and potentially benefiting from them. His paper stems from a critique of "the common social-scientific practice of using identity categories . . . to infer people's interests." It raises the crucial question of the relevance of institutional policies in the production of frameworks for thinking about and acting upon one's environment, but on the whole I find it a bit disappointing.

First, his critique of the use of identity categories to infer interests (a critique of class- and gender-based explanations of interest-driven struggles) seems to me extremely simplistic. Since E. P. Thompson's (1996) studies of class formation in England, the production of a collective political agency has not been a matter of "belonging" to a pre-given identity category that defines an

essentialized "interest" and determines individual practice. Agrawal seems to view the identity category ahistorically instead of as a set of complex historical processes that drive people to act, feel, and think about their real-life problems collectively at particular conjunctures, including various forms of alliances and struggles even within the group that eventually coalesces as a homogeneous "class." The debate over the recuperation of Gramsci's concept of "hegemony" is an attempt to address this complexity and also to highlight the processes by which subjects' heterogeneous practices may not lead to collective forms of wielding power (Roseberry 1994, Smith 2004).

Following a perspective inspired by Foucault (1975, 1997, 2004), Agrawal seeks to explain the "making of environmental subjects." He presents the passage from a "technology of domination" to a "technology of the self" in the policing of nature by the state and thus the articulation or continuum between the meaning of "subject" as a function of subordination and its meaning as a function of action. However, the survey's questions are very forthright ones of the type "forests should be protected" or "willingness to reduce family consumption of forest products" that are interpreted as "environmental beliefs." Ethnographic information is scarce beyond the "texture" provided by some quotes from interviews, and it is difficult to get an idea of what people "do" beyond what people "say they do." Therefore the ground for the analysis of "practice" as leading to the transformation of subject positions and, as a result, to "intimate government" is weak.

My last uneasiness has to do with the historical evidence. In the first scene the British colonial state is effecting the appropriation of forests located in the Kumaon area, and we witness the confrontations between villagers and the Forest Department concerning access and use of forest resources. We are told that "Kumaonis ignored the new rules that limited their activities in forests that the state claimed as its own" and often "continued to do what they had done before." What we are not told is what form of organization for access to forest resources the local communities had before the colonial state. What previous practices had formed particular subjectivities that were ready to engage with the colonial state in struggles presumably aimed at upholding what they had historically constructed as their "interest"? The relevance of this historical information has to do with what happens in the 1930s when state officials come to realize that they need the cooperation of villagers for the efficient control of forest resources and create "community-managed forests." The new community-managed environmentality therefore appears detached from any pre-existing form of communal management of the forest.

Finally, the paper should be more precise about the devolution of rights to the community. What capacity, if any, does the state retain in establishing the modes of regulation of forestry resources? Why do some villagers voluntarily refrain from participation in collective regulation and enforcement of forestry resources? How,

then, are differential environmental subjects produced? There seems to be a certain circularity in the argument that increased participation in environmental regulation and enforcement produces environmental subjectivities when we are not enlightened as to what sorts of social relations within the village communities enhance or inhibit participation in forest councils.

Agrawal's objective is extremely relevant from both a scholarly and a policy-oriented perspective regarding the consequences of "village community" involvement in forestry management. In my view, however, the concrete historical processes that produce particular forms of government and subjectivities are represented by insufficient evidence, while the data analysis is often obscured by oversignified concepts.

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This ambitious and absorbing paper takes aim at a central problem in environmental politics: how is it that people come to a sense of commitment to their local "environment"? What is it, in other words, that turns them into conservationists? This is a problem that is often naturalized, so to speak, in the academic and activist conservation literature. It is frequently assumed, for example, that a failure on the part of the rural poor to value local nature is a mark of some kind of false consciousness remediable through (environmental) education. There is often little traction here, as critics of this view largely operate within the same episteme, pointing to structural constraints that undercut and supersede education and motivate people to act in their "immediate" rather than their "real" interests. Agrawal's paper effectively dispenses with this problematic by opening up the theoretical apparatus of structure and agency to the more Foucauldian framework of the subject and power. This introduces a range of possibilities, including the attention to government that occupies the center of the paper. (The other elements of the Foucauldian triad—discipline and sovereignty—are less explicitly explored here, though both are conventional sites of "environmentality" analysis.)

The particular way in which Agrawal deploys the idea of "environmentality" represents a productive departure from previous uses of the term to characterize the relationship between environment and government. Rather than focusing on the discursive production and regulation of the environment through the proliferation of supranational institutions, he closely attends to more intimate practices, examining the recursive relationship between the experience of participation in local institutions, subject formation, and expressed political positions (which he carefully delinks from a "politics of location"). This strategy promises to reinvigorate what is already becoming a rather conventional invocation of governmentality in anthropology and cognate fields.

Though Agrawal might helpfully place more emphasis on tensions between the two, he introduces the valuable distinction between government-at-a-distance and "intimate government," the latter intersecting with recent work in anthropology on the practices of the local state and usefully allowing for sensitivity to contingency, openness, affect, embodiment, etc. Still, the ironies of intimate government are worth dwelling on. As he demonstrates, decentralized, localized forms can even more effectively interpellate—and subject—environmental subjects than the more distantly conceived projects on which political ecologists and others have tended to focus.

Nonetheless, what is particularly helpful in this is the move away from a notion of the "environment" as narrowly disciplinary. The analysis here is effectively multidirectional, and the concept of "interests" at play is extremely plastic. Agrawal is not dispensing with the influential notion of "coercive conservation" introduced by Nancy Peluso some years ago. People in Kumaon are subjected in becoming environmental subjects, but they exercise some form of "agency" in and through their subjectivation. Though I suspect that we still have little satisfying to say about the complex and deeply biographical practices through which environmental subjects "make themselves" and, equally, "are made," Agrawal convincingly shows people in Kumaon struggling to negotiate conflicting senses of what might be their "best" interests (e.g., family, landscape, income), and this too is an important intervention.

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With characteristic boldness and verve, Agrawal attempts in this essay nothing less than a break from the way in which we have conventionally thought of the environment. This break is signaled by his use of the category "environmental subjects." Extending the spirit of his thought-provoking work, I would like to ask whether this reworking of the concept of governmentality could be extended farther still, to the point where the politics of Kumaon allows us to think of ways of transforming the concept itself.

As a point of departure we might consider two themes that, though not explicitly stressed by Foucault, are constitutive of his concept of governmentality—its distinctive totality and its intimacy. Now, "totality" might seem to be an inappropriate term to use in relation to governmentality, given the latter's diffuse nature. Yet, if "population" is central to his argument, this is because it is the totality appropriate to governmental power, supplementing and displacing the older totality of the sovereign prince. With its emergence, government can be conceptualized as concerned with the welfare of the population rather than of the prince. The distinctive intimacy of this totality is brought out in Foucault's stress

on immanence rather than transcendence. An immanent relationship (as distinct, for example, from the more classically transcendent relationship of states with population that James Scott [1998] stresses in his *Seeing like a State*) is also, to put it too briefly for now, an intimate relation; hence the simultaneous stress on continuity. This concept of governmentality breaks with liberal autobiographies of power, of which the Weberian account is only an especially classical version. In this latter account, the consolidation of modern power involves a move from intimacy to anonymous trust and from dispersed and fragmentary forms of patrimonial power to the transcendental totality of bureaucratic power. Foucault implicitly questioned these accounts.

Clearly, there are significant resonances between Foucault's arguments and the situation that Agrawal describes. Most evidently, there is a shift from no-saying government to one that focuses much more on tactics—intimate government. Nevertheless, there seems to be one significant difference: the impossibility of a governmentalized totality. The forest councils have been instituted because the state cannot control the forests. These councils are thus not only the lowest level of continuity in government but also an acknowledgment of the impossibility of sustaining a totality—of the existence of a politics beyond governmental power. This impossibility of totality and the consequent politics seem to mark the working of the forest councils, with the result that there seems to be a disjuncture and even agonism between them and other levels of governmental power. The forest councils, in this sense, are not continuous with governmental power even when they achieve results desired by the state. This impossibility of totality has far-reaching reverberations. To name just one, if the forest councils are not entirely continuous with government, then their intimacy is not a governmental intimacy; it is, rather, an intimacy which, remaining outside government, achieves some of the state's goals.

My point is simple. It is clear from Agrawal's paper that regulatory strategies associated with and resulting from community decision making transform those who participate in such decision making. Nevertheless, governmentality as a concept may not be adequate for an understanding of these transformations or the operation of power in Kumaon. But I do not for a moment wish to suggest that power in Kumaon is in some way pre-governmental, and even less do I wish to fall back on the historicist waiting-room theories of history involved in Weberian accounts. Rather, it seems to me that Agrawal's argument about governmentality and environmental subjects could be extended further. A presumption that he makes is that the environment that is the object of the state's actions is the same as the "environment" that so many Kumaonis operate with. But is the category "environment" transparent and perfectly translatable in this manner? What techniques of the self, what histories, what displacements are congealed in Kumaoni contestations around the "environment"?

I do not say this from an anthropological perspective.

My argument is not that there are multiple environments and multiple governmentalities—treating power as it does, governmentality is heterogeneous to disciplinary anthropology. My suggestion is rather that because the governmental totality is ruptured (and not only in Kumaon, but always already: this is the sense in which the idea of colonial governmentality is suggestive but too modest about its own potential), the object of government, here the environment, is displaced by other techniques of the self, other histories. In thinking this displacement, perhaps we can rework the concept of governmentality itself.

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Agrawal's paper performs a valuable service by bringing the literature on governmentality and subject formation to bear on the arena of environmentalism. While the idea that environmental subjectivities are transformed in response to changes in policy and practice is not novel even within the Indian context (Mosse 1995; Sundar 2000b, 2001), it has not been the focus of previous research in this area. Agrawal's paper is also useful in that it challenges, though without explicitly naming, both the ecofeminist (Shiva 1989) and the economistic (Agrawal 1998) writing that has been influential in certain strands of thinking on environmentalism in India. While the ecofeminists assume that women are innate environmentalists, the economistic literature reads environmental interests from material interests, class/caste location, etc. Pointing to the reductionism of both models, Agrawal highlights the critical role of institutions and environmental practices in creating new forms of identity and a concern for the environment.

However, he fails to do his project full justice. Indeed, his conclusions appear almost tautological: the more people participate in environmental regulation, the more they realize the need for it. While I appreciate his desire to frame the issues in terms other than the usual ones of common property management and collective action, he might at least have acknowledged the problem that these terms pose. We are told in passing that some villages constituted themselves into forest councils in response to "concessions from the state and experiences of scarcity." Yet surely one would want to know whether existing environmental concerns have anything to do with why scarcity and state concessions translate into action in some villages and not others. For Agrawal, by and large, local environmentalism is an offshoot of the councils rather than a cause. The policy implications are that the more forest councils the government promotes, the more people will be "motivated" to protect the forests. Yet the actual experience of forest policies and practices in Kumaon (and elsewhere in India) seems to have been rather different, with target-driven councils sometimes displacing local initiative.

In Agrawal's reading of the archives, acts of environmental vandalism directed against the forest and the Forest Department such as arson, unrestrained felling, or lopping have gradually ceded—following the 1931 Forest Council Rules — to concern for forest protection and a greater willingness to work with the department. Governance at a distance has worked successfully here to involve people in managing their own resources. An alternative reading of this historical trajectory begins at least a stage earlier and ends a stage later. Precolonial systems of land and forest management were subject to colonial appropriation and reservation of forests. Arson and felling, read here as protest (see also Guha 1989), won villagers a minor victory in the form of the 1931 rules. The government gradually reappropriated powers through changes to the Forest Council Rules in 1976, a bank-funded, target-driven joint forest management program in the 1990s, and a Supreme Court ban on felling (Sarin 2003). In short, while state practices have transformed environmental concerns, this process has been far less linear than Agrawal allows.

Indeed, the history of forest management and the environmental subjectivities it represents—both those of foresters and those of villagers—is extremely complex. In several places, foresters recognized local rights and debated the wisdom of various local environmental practices. Villages with well-worked-out systems of forest protection sometimes gave these up as their forests were taken from them; in others they continued in attenuated form, and in yet others villagers adopted colonial regulations as their own indigenous "customs" (Sundar 2000a). If the subjectivity of villagers changed in response to changing forms of governmentality, so perhaps did that of the Forest Department, despite its being armed with the ideology of "scientific" forestry. One wishes that Agrawal had also studied the transformations in bureaucratic consciousness.

While persuading us that practice is the transformative middle ground for subject formation between domination and autonomous resistance, Agrawal neglects to flesh out the contours of this practice. When he tells us, for instance, that "intimate government involves the creation and deployment of links of political influence between a group of decision makers within the village and the ordinary villagers whose practices it seeks to shape," one expects greater narrative elaboration and critical analysis of these links. Is voicing concern about the forests and contributing monetarily to its protection all it takes to be an "environmental subject"? Or might Sukhi Devi of Nanauli have a different understanding of the forest itself, which privileges short trees and mixed stands as against tall timber species, and a sense of the way in which the social and ecological environments relate to each other that is at variance with that of the decision makers in her village? While Agrawal is right to distance interests from identity, closer attention to practice might have shown how the processes of subject formation depend on location. The kind of environmental subjectivity being framed through participation in these councils appears to be largely an elitist one, which,

as other research has shown, often works at the expense of poor women (Sarin et al. 1998, Sundar 2001).

Reply

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In his story "Funes, the Memorious," Jorge Luis Borges describes for us a perfect memory. Before being thrown by a horse at the age of 19, Ireneo Funes lived like all humans, "looked without seeing, heard without hearing, forgot everything—almost everything." When he recovered consciousness after his fall, he had more memories in himself alone "than all men have had since the world was a world." His world was "almost intolerable it was so rich and bright. . . . [He] could reconstruct all his dreams, all his fancies. . . . Funes not only remembered every leaf on every tree of every wood, but even every one of the times he had perceived or imagined it. . . . Without effort he had learned English, French, Portuguese, Latin. . . . [Nevertheless] in the overly replete world of Funes, there were nothing but details, almost contiguous details."

Raffles gently observes that environmental subjects make themselves and are made through "complex and deeply biographical practices" about which much satisfying work remains to be done. Indeed! To the extent that the other respondents engage the central issue raised in my paper—the relationships between institutions and subjectivities as mediated on the ground of practice—this observation captures much of what they say. I concur with Raffles that my paper suffers from a certain form of descriptive poverty. His own writings in this regard are, in contrast, especially rich, and such richness is surely part of what is necessary to gain a better sense of what it means to become anew.

Having accepted this, I confess that I detect a certain common ground in the responses to my paper. On the surface, they appear diverse in style, in tone, in their specific demands, and in the implicit appeals to the literatures they consider. But consider the main thrust of the different criticisms: Narotzky desires more evidence on concrete historical processes to which I allude and less reliance on the oversignified concepts that I use to analyze my data. Sundar feels that I should have begun my history of the management of Kumaon's environment earlier (and ended it later) than I do, although she does not consider whether such a broadening of historical view would change my analysis or conclusions materially. Hathaway suggests that I could have thought more carefully about how social context mediates the prehistory of participation in the forest councils—a wish that has an echo in Sundar's and Narotzky's pieces. Gupta wants more information about the differences in perceptions between villages where councils were formed and others. These are demands for more evidence,

different kinds of evidence, and more reflection about how concepts such as gender, participation, and class connect to the making of subjects. Most of these criticisms are well justified by the gaps in my paper, and addressing them is likely an important part of what needs to happen to extend and deepen the analysis of changing and reconfigured identities. Instead of responding directly to the imperatives they pose, however, it may be instructive to reflect for a moment on the nature of these criticisms. Ultimately, they all are about the two faces of science—evidence and concepts—that are the staple of most criticisms. Taking the central task of my paper as reasonable and appropriate, even desirable, they indicate other ways in which I should have proceeded, other concepts I could have used to present my argument more convincingly, other evidence I could have deployed. I am heartened by these demands.

The central issue provoking my paper is the belief that establishing connections between institutions and identities, practices and preferences, sociality and subjectivities—a project that was central to the late-nineteenth- and early-twentieth-century social-scientific writings of Marx and Weber and Durkheim—has received much less attention in the past few decades than is its due. In our discipline-bound social-scientific enterprise, economists and many political scientists have placed their faith in a dehistoricized model of rational man that is insensitive to contextual differences. The writings of historians and anthropologists profit by comparison, but it can be said that much of the work on subjectivity in these latter disciplines is insufficiently sensitive to variations in self-formation as such variations are shaped by power. And perhaps it is not out of place to note that theories of agency and the relationship between agency and structure are generally inadequate as lenses through which to understand the making of subjects, tied as they are to an ontological view of power as constraint.

In this context of relatively limited and often ahistorical attention to the deeply biographical processes through which particular kinds of subjects come into being (or do not), the direction and force of the critiques implicit in Narotzky's, Sundar's, Gupta's, Hathaway's, and Raffles's demands convince me that many other analysts would welcome greater and more diverse ways of understanding how new kinds of subjects are made and unmade, when existing identities transmute into new ones and when they do not, and to what extent one can speak of endogenous preferences when thinking about institutional analysis and choice. Therefore, I am pleased, a bit, by the fact that Narotzky is "a bit disappointed." Her concerns and those voiced by the others may stem from grounds that I have chosen to call common, but they are also positive and productive—an implicit argument that far more social-scientific work needs to be done where identities and institutions are concerned, and not only more work but also work across disciplinary divisions that separate scholars of identity, subjectivity, and preferences as surely as if they were imprisoned in different cells of a panopticon. In view of the amount that remains to be done, some of the points

raised in this exchange—regarding whether my analysis is grounded in Foucault or rational choice, whether I use too many words or too few, and whether my respondents and I have represented each other's arguments too simplistically—appear almost irrelevant.

Without undermining the importance of the various points of critique advanced by my respondents, however, let me also note that to engage them in their specificity would also be to lose an opportunity to move the discussion about the relationship between government and subject formation in a somewhat different direction. This direction is prefigured in Skaria's response. His focus on a governmentalized totality engages an aspect of my paper that is relatively marginal to the social-scientific thrust of the argument but central to the philosophical foundations of the relationship between the state and the social. I interpret him to be asking whether it might be possible for government to be total, although he himself asserts quite definitively the impossibility of a governmentalized totality.

The governmentalization of the social marked by the recourse to community and community institutions in Kumaon is a particular technology of power that the colonial state implemented and the postindependence Indian state continued. Setting aside for the moment normative questions about whether such localization of the exercise of power helps or hinders the projects of freedom and equality—concerns surely germane to social-scientific investigations—Skaria's assertion forces us to try to imagine what total government might look like. Although he may essentially be correct that government even in a Foucauldian sense cannot be total, this conclusion blocks avenues that might interestingly be explored. Along one such avenue one might think about the nature of the relationship between the social and the governmental and, analogously, the community and the state. I imagine this relationship, to use a Foucauldian phrase, as one of permanent provocation—in which processes of governmentalization and resistances to such processes may collectively perhaps be characterized by the metaphor of totality. To this way of thinking, government aims to reduce the possibility of unpredictable outcomes by making those subject to government realize the importance of careful use of environmental resources such as forests and pastures or clean air and water. Containing the random, manifesting the illegible, and systematically identifying the reasons behind the seemingly whimsical and the fanciful become the task of government. Collaboration in this task by multiple selves as they learn and cognize the dangers of the unpredictable is the end of government. To the extent that a greater awareness of the dangers of unpredictability permeates imagining about the future, government tends toward totalization. More crucially, to the extent that the provocative relationship between government and the social occupies the strategic use of power in all its forms, that relationship becomes totalizing even if government cannot be.

Several recent poststructuralism-inspired analyses reimagine categorical distinctions such as those between rhetoric and substance, indigenous and scientific knowledge, written and oral strategies of awareness, and the state and the community as mechanisms for organizing human interactions. Insofar as these analyses undermine familiar distinctions, they prepare the ground for rethinking of the relationship between the governmental and the social by suturing together larger conceptual domains within which distinctions related to those between the formal and the informal, in turn linked to the emergence of modernity, cease to make sense. They simultaneously, perhaps unintentionally, make it easier to imagine a totalizing government.

It is necessary here to reemphasize the importance of what I call intimate government. Skaria remarks upon it, but I believe the idea can be elaborated a little to engage more fully his concerns about the possibility of a governmentalized totality. Intimate government is important because it concerns the interpenetration of the social and the personal through the means of power in its positive guises. My paper discusses two different forms of intimate government: that by which selves are remade and that which operates on the social body of the community. It seems to me now that intimate government works not just in two but in many and heterogeneous ways. The sheer heterogeneity and complexity of the biographical that Raffles mentions in passing presages the diversity of intimate government. Borges's Funes "noted the progress of death, of moisture. He was the solitary and lucid spectator of a multiform world which was instantaneously and almost intolerably exact." To think of intimate government should be to imagine the multiformity of governmentalizing forces.

But there is a uniting force that underpins the multiformity of governmentalization once one displaces the state from its central position in the production of government. Government is the use of power in accordance with knowledge: It is inspired by the recognition of necessity that better knowledge confers; it is signified in the ways in which bodies act in a social space. Thus, the necessity to undertake particular courses of action—because they are in one's interest or because they serve the needs of a population—is the singular and totalizing force connecting the heterogeneity of government. Contra Gupta, intimacy, as it marks the network of environmental practices within communities and imagination within selves, is central to a totalizing environmentality. Contra Sundar, the idea of elitism is insufficient to encompass the kinds of government and subjectivities being produced through participation in decentralized environmental institutions. A totalizing government is imaginable within the infinite and limited domains of power that communities and selves signify.

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Indigenous and Scientific Knowledge:
Some Critical Comments[1]

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Abstrak

   Dalam artikel ini, penulis bertujuan untuk merangsang terjadinya debat tentang pengetahuan lokal (indigenous knowledge) bertitik tolak dari pendapatnya tentang adanya kontradiksi dan kelemahan-kelemahan konseptual dalam banyak tulisan tentang pengetahuan lokal. Pokok permasalahan yang dibahas dalam artikel ini terutama memfokus pada argumen penulis bahwa perbedaan antara pengetahuan lokal dan pengetahuan ilmiah atau barat dapat menimbulkan masalah bagi mereka yang percaya atas makna penting dari pengetahuan lokal bagi pembangunan. Artikel ini mengkaji beberapa kontradiksi dan ironi yang terdapat dalam upaya memberikan penekanan pada makna penting pengetahuan lokal. Menurut penulis, pembedaan pengetahuan lokal dan pengetahuan Barat sebagai dua tipe pengetahuan merupakan hal yang tidak produktif dalam upaya melibatkan peranan pengetahuan lokal itu dalam pembangunan yang tangguh dan berkelanjutan. Penulis juga mengemukakan bahwa sebenarnya tidak ada sesuatu yang baru tentang retorika dan perwujudan pengetahuan lokal. Ia pun berpendapat bahwa strategi untuk menyusun arsip dan menyebarluaskan pengetahuan lokal itu juga bertentangan dengan konsep dasar dari pengetahuan lokal itu sendiri. Bagian akhir dari artikel ini secara tentatif menelusuri sejumlah kemungkinan dalam mencari jalan ke luar dari dilema ini. Di antaranya adalah melaksanakan preservasi pengetahuan lokal in situ. Upaya ini hanya akan berhasil bila penduduk setempat dapat memperoleh kontrol atas penggunaan lahan dan sumber-sumber daya alamnya.

Introduction

   In the decades since the Second World War, the rhetoric of development has gone through several stages–from its focus on economic growth, to growth with equity, to basic needs, to participatory development, to sustainable development (Bates 1988; Black 1993; Hobart 1993; Watts 1993). Today, indigenous knowledge is seen as pivotal above all in discussions on sustainable resource use and balanced development (Brokensha *et al*. 1980; Compton 1989; Gupta 1992; Niamir 1990; Warren 1990). This orientation is in stark contrast to the views of many earlier theorists, who saw traditional knowledge and institutions as obstacles to development.

   The focus on indigenous knowledge clearly heralds a long overdue move. It represents a shift away from the preoccupation with the centralized, technically oriented solutions

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of past decades, which failed to improve the prospects of most of the world's peasants and small farmers. By highlighting the possible contribution to be made by the knowledge which is in the hands of the marginalized poor, current literature focuses both attention and resources on those who must need them. Recognizing the validity of many of the arguments employed by the theorists of indigenous knowledge, this article attempts to generate a debate by suggesting that there are certain contradictions and conceptual weaknesses in most of the writings on indigenous knowledge.

The presumed basis for indigenous knowledge

In the positive response that has hailed the emergence of the most recent focus of development practitioners, one may be prompted to ask what is new about the rhetoric and practice of indigenous knowledge. Surveying some of the major works on the subject, the following claims can be distinguished. Indigenous knowledge differs from Western or scientific knowledge on:

- substantive grounds–because of differences in the subject matter and characteristics of indigenous and Western knowledge;
- methodological and epistemological grounds–because the forms of knowledge employ different methods to investigate reality;
- contextual grounds–because traditional/ indigenous knowledge is more deeply rooted in its environment (Banuri and Apffel-Marglin 1993; Chambers 1980:2; Dei 1933; Howes and Chambers 1980; Warren 1989 and 1990:1).

To ignore people's knowledge is almost to ensure failure in development (Brokensha *et al*. 1980:7-8).

Since indigenous knowledge is essential to development, it is often suggested that it must be gathered and documented in a coherent and systematic fashion (Brokensha *et al*. 1980; Warren *et al*. 1993). As more studies of indigenous knowledge become available, its relevant to development will become self-obvious. Such studies, so the argument goes, should be archived in national and international centres in the form of databases; the information in these databases could be systematically classified. The collection and storage of indigenous knowledge should be supplemented with adequate dissemination and exchange among interested parties, using newsletters, journals and other media (Warren *et al*. 1993).

In accenting the importance of indigenous knowledge, however, theorists of indigenous knowledge are caught on the horns of a dilemma (Brokensha *et al*. 1980; Chambers *et al*. 1989; Warner 1991; Warren *et al*. 1991). On the one hand, their focus on indigenous knowledge has gained them an audible presence in the chorus of development. At the same time, talking about indigenous knowledge commits them to a dichotomy between indigenous and Western knowledge–a dichotomy that many earlier anthropologists, including Malinowski, Boas, Lévi-Bruhl, Mauss, Evans-Pritchard, Horton and Lévi-Strauss have already debated. In dazzling analyses of 'primitive' and modern cultures and systems of knowledge, Lévi-Strauss (1962, 1966), for example, anticipated many of the arguments advanced today to create a demarcation line between indigenous and Western knowledge. Lévi-Strauss suggested that 'primitive' cultures are more embedded in their environments than modern cultures; 'primitive' peoples are less prone than scientific investigators to analytic reasoning, that might question the foundations of their knowledge;

and 'primitive' thought systems are more closed than scientific modes of thought. Unfortunately, neither Lévi-Strauss' arguments nor current attempts to separate indigenous knowledge from Western knowledge can be sustained. This article further suggests that the strategy of archiving and disseminating indigenous knowledge runs contradictory to the very conceptual basis of what is seen to be 'indigenous' in indigenous knowledge.

Problems related to the category of 'indigenous knowledge'

The attempt to create two categories of knowledge–indigenous/traditional vs. Western/scientifc–ultimately rests on the possibility that a small and finite number of characteristics can define the elements contained within the categories. But the attempt fails on each of the three counts: substantive, methodological and contextual.

Substantive differences

There are differences between indigenous and Western knowledge with respect to their history and distinctive characteristics. However, the presumption that indigenous knowledge is concerned with the immediate and concrete necessities of people's daily livelihoods, while Western knowledge attempts to construct general explanations and is one step removed from the daily lives of people, does not hold water. There is scarcely any aspect of life in the West today that does not bear the imprint of science.

At the same time, many writers on indigenous knowledge agree that it also encompasses 'non-technical insights, wisdom, ideas, perceptions and innovative capabilities' (Thrupp 1989:139). Indeed, by what yardstick of common measure–without creating completely meaningless categories–can one juxtapose a Hume and a Foucault, a Derrida and a Von Neumann, or a Said and a Fogel" And by what tortuous stretch of imagination would one claim that there are similarities between the Azande beliefs in witchcraft (Evans-Pritchard 1936) and the decision-making strategies of the Raika shepherds in Western India (Agrawal 1993), or between the beliefs of different cultures on intersexuality (Geertz 1983:80-4), and the marketing activities in traditional peasant communities (Bates 1981; Schwimmer 1979)

Thus, on the one hand, there are striking differences between philosophies and several forms of knowledge commonly viewed as either indigenous or Western. On the other hand, we may also discover that elements separated by this artificial divide share substantial similarities, as, for example, agroforestry and the multiple tree-cropping systems of small holders in many parts of the world (Rochelea 1988; Thrupp 1989); agronomy, and the indigenous techniques for the domestication of crops (Reed 1977; Rhoades 1987); taxonomy and the plant classification system of the Hanunoo or the potato classification systems of Peruvian farmers (Conklin 1957; Brush 1980); or rituals surrounding football games in the United States and, to use a much abused example, the Balinese cockfight.

The classification into indigenous and Western knowledge fails not only because there are similarities across those categories and differences within them. The attempt founders at another, more fundamental, level as well. It seeks to separate and fix in time and space (i.e. separate as independent and fix as stationary and unchanging) knowledge systems that can never be so separated or fixed. In the face of evidence that suggests contact, diversity, exchange, communication, learning and transformation among different systems of knowledge and beliefs (Lévi-Strauss 1955;

Wallerstein 1974, 1979; Wolf 1983), it is difficult to adhere to a view that separates indigenous and scientific/Western knowledge.

Methodological and epistemological differences

Some indigenous knowledge theorists have argued that science is open, systematic, objective and analytical. It advances by building rigorously on prior achievements. Indigenous knowledge, however, is closed, non-systematic, holistic rather than analytical, advances on the basis of new experiences, not on the basis of a deductive logic (Banuri and Apffel-Marglin 1993; Howes and Chamber 1980). Given the failure of numerous philosophers of science, including Leibniz, Popper, Carnpa, Grunbaum and Lakatos, to find satisfactory demarcation criteria between science and non-science, it is, perhaps, unnecessary to undertake a tedious investigation of the limitations of such a claim– which would constitute, as it were, a reinvention of the wheel. Most philosophers of science have long abandoned the hope of a satisfactory methodology for distinguishing science from non-science. From the collapse of Bacon's recipe for the advancement of learning, to the failure of the logical positivists of the Vienna School in the first half of the 20th century to find verification criteria that could separate science from meaningless metaphysics to the demise of Popper's and Lakatos' demarcation principles–the history of attempts to delineate scientific methodologies is littered with the debris of shattered theories (Kulka 1977).

Feyerabend's (1975) attacks on the dogmatism and intolerance of scientists towards insights and methods of inquiry outside established, institutionalized science are sufficiently on target that even his avowed critics accept them (Tibbetts 1977:272). At the same time, as Dirks *et al.* (1994:3) remark, it was the virtual absence of historical investigation in anthropology which made cultural systems appear timeless, at least until ruptured by 'culture contact'. In such a situation, it is impossible to insist upon the openness of science to attempts aimed at dislodging it, or the closed nature of traditional knowledge systems.

Contextual differences

Indigenous knowledge is often seen to exist in a local context, anchored to a particular social group in a particular setting at a particular time. Western knowledge, on the other hand, has been divorced from an epistemic framework in the search for universal validity (Banuri and Apffel-Marglin 1993:11/13). One may well question whether such a distinction makes sense. One of the most devastating critiques of technical solution-oriented development policies of the last five decades has been that they ignored the social, political and cultural contexts in which they were implemented. But if attempts to implement Western technically oriented solutions failed because they did not recognize the imperatives entailed by different socio-political-cultural contexts, it is likely that the so-called technical solutions are as anchored in a specific milieu as any other system of knowledge.

When contemporary philosophers of science attempt to understand what scientists do (Kuhn 1952; Barnes and Bloor 1983; Knorr Cetina 1981; Latour and Woolgar 1979), they focus on the social moorings of science, and in so doing question the stock assessment of science as objective and rational. More recent accounts emphasize scientific practice and the context upon which scientists draw to create scientific products such as instruments, facts, phenomena, and interpretations. By insisting on the 'multiplicity, patchiness and heterogeneity of the space in which scientists

work' (Pickering 1992: 8), this view of science as practice and culture successfully goes beyond not just earlier epistemologies rooted in rationalism, but also the later reductive representations that saw science 'as relative to culture (Kuhn, Feyerabend), [or] are relative to interests (Sociology of Scientific Knowledge)' (Pickering 1992:7). The discursive space purchased foregrounds the practices of science, and can form a valuable resource for the thus construction of epistemic foundations. To successfully build new epistemic foundations, accounts of innovation and experimentation must bridge the indigenous/Western divide.

In examining specific forms of investigation and knowledge creation in different countries and different groups of people, we can allow for the existence of diversity within what is commonly seen as Western or as indigenous. At the same time we can find a common link in the concentration on the ways in which 'indigenous' or 'Western' scientists create knowledge. Instead of trying to conflate all non-Western knowledge into a category termed 'indigenous', and all Western knowledge into another category it may be more sensible to accept differences within these categories and perhaps find similarities across them.

Conserving indigenous knowledge

According to most theorists, the prime strategy for conserving indigenous knowledge is *ex situ* conservation, i.e., isolation, documentation and storage in international, regional, and national archives (Brokensha *et al.* 1980; Ulluwishewa 1993; Warren 1989; Warren *et al.* 1993). This is technically the easiest and politically the most convenient strategy, but it is unconsciously yet fatally at odds with the desire to maintain distinctions between scientific and indigenous knowledge.

First, if indigenous knowledge is inherently scattered and local in character, and gains its vitality from being deeply implicated in people's lives, then the attempt to essentialize, isolate, archive and transfer such knowledge can only seen contradictory. If Western science is to be condemned for being non-responsive to local demands, and divorced from people's lives, then centralized storage and management of indigenous knowledge lays itself open to the same criticism.

Second, because of the dynamic nature of indigenous knowledge and its changing character against the background of the changing needs of peoples, the strategy of *ex situ* conservation seems particularly ill-suited to preserving indigenous knowledge. Such strategies, advanced in another context to combat the erosion of biodiversity and save genetic germplasm, are increasingly being viewed as inadequate and unsatisfactory (Altieri 1989; Falk 1990; Hamilton 1994; Wilson 1992). When biologists recognize that *ex situ* conservation is a defective strategy to preserve physically distinguishable entities such as seeds and plants, it seems ironic that we are advocating the same problematic strategies to preserve knowledge which is integrally linked with the lives of people and is constantly changing. However, the ultimate irony in the attempt to valorize indigenous knowledge may lie in the willingness to adopt the methods and instruments of Western science. Thus few theorists accept the utility of indigenous knowledge in itself, and most writings first purpose the validation of indigenous knowledge by means of scientific criteria (Massaquoui 1993; Rajan and Sethuraman 1993: Richards 1980). If Western science is the ultimate arbiter of knowledge, then there seems little point in advocating the distinction between scientific and indigenous knowledge.

Different directions?

If the primary motive for highlighting the knowledge of the marginalized poor is to find them a greater voice in development, then it would seem preferable to foreground this objective, rather than framing it in terms of the confounding rhetoric of indigenous vs. Western/scientific knowledge. If indigenous knowledge systems are disappearing, it is primarily because the pressures of moderni-zation and cultural homogenization, under the auspices of the modern nation-state and the international trade system, threaten the lifestyles, practices and cultures of nomadic populations, small agricultural producers and indigenous peoples. The appropriate response from those who are interested in preserving the diversity of different knowledge systems, might then lie in attempting to reorient and reverse state policies to permit members of threatened populations to determine their own future, thus facilitating *in situ* preservation of indigenous knowledge. *In situ* preservation cannot succeed unless indigenous populations and local communities gain control over the use of the lands on which they dwell and the resources on which they rely. Those who are seen to possess knowledge must also possess the right to decide on how to conserve their knowledge, and how and by whom it will be used.

In situ preservation may make knowledge more costly for those outsiders who wish to gain access to it for free dissemination. The mechanics of such preservation are little understood and may pose significant political and ethical challenges. To these and similar objections, there are two simple rejoinders:

· *ex situ* preservation of indigenous knowledge is likely to fail–creating only a mausoleum for knowledge;
· *ex situ* conservation, even if it is successful in unearthing useful information, is likely to benefit the richer, more powerful constituencies–those who have access to international centres of knowledge preservation–thus undermining the major stated objective of conserving such knowledge; to benefit the poor, the oppressed and the disadvantaged

Conclusion

This article began by questioning the presumed distinction between indigenous and Western knowledge, and this had two immediate consequences. The interrogation undermines the possibility that any piece of knowledge can be forever marked or fixed as 'indigenous' of 'Western'. Indeed, I suggest that the attempt to create distinctions in terms of indigenous and Western is potentially ridiculous. It makes much more sense to talk about multiple domains and types of knowledge, with differing logics and episte-mologies. It is something of a contradiction–through an unavoidable one–that the same knowledge can be classified one way or the other, depending on the interests it serves, the purposes for which it is harnessed, or the manner in which it is generated.

Second, and more significantly, I argue for the recognition of a basic political truism. Necessarily anchored in institutional origins and moorings, knowledge can only be useful. But it is useful to particular peoples. Specific strategies for protecting, systematizing, and disseminating knowledge will benefit different groups of people in different ways. The recognition of this simple truism is obscured by the confounding labels of 'indigenous' and 'Western'. It is only when we move away from the sterile dichotomy between indigenous and scientific knowledge, that a productive dialogue can ensue which focuses on safeguarding the interests of those who are disadvantaged.

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Komentar

Agrawal, dalam *Indigenous Knowledge and Development Monitor (IKDM)* 1995 Vol.3(3):3-6 yang diterbitkan kembali dalam edisi ini menyatakan bahwa banyak tulisan-tulisan tentang *indigenous knowledge* mengandung sejumlah kontradiksi dan kelemahan-kelemahan konseptual. Dalam *IKDM* 1996 Vol.4(1):12-19 telah dimuat komentar-komentar tentang isu yang dilontarkan Agrawal. Komentar-komentar tersebut terus bergulir pada edisi berikutnya, *IKDM* 1996 Vol.4(2):17-33, termasuk tanggapan Agrawal terhadap komentar yang telah dimuat dalam edisi sebelumnya. Tidak seluruh komentar dapat dimuat dalam terbitan ini. Namun, untuk membantu pembaca mencermati debat yang berlangsung di antara para pakar masalah *indigenous knowledge*, redaksi memuat sebagian komentar yang dimuat dalam edisi *IKDM* 1996 Vol 4(1):12-19, serta tanggapan Agrawal terhadap komentar tersebut yang dimuat dalam *IKDM* 1996 Vol.4(2):12-13.

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There are good reasons to agree with Agrawal's concern about the *ex situ* conservation of indigenous knowledge, and with his analysis of the social consequences of archiving and disseminating indigenous knowledge, insofar as it affects the welfare of economically marginalized indigenous peoples. However, his critique of the distinction between indigenous and scientific knowledge cannot be accepted out of hand. Many of the alleged distinction between indigenous and scientific knowledge are indeed without solid foundation[2]. Nonetheless, there are a number of differences which Agrawal fails to point out.

The fundamental source of confusion in Agrawal's analysis lies in the fact that he equates 'scientific' knowledge with 'Western' knowledge. All scientific knowledge clearly is not Western (many of non-western region the world are sources of scientific knowledge), nor is all Western knowledge scientific (much ordinary knowledge common to people in the so-called Western world is not the result of scientific investigation). Strangely enough, the confusion between the two categories leads Agrawal to present the correct beliefs of Hume, Foucault and Said as representatives of scientific knowledge. More seriously, this confusion makes comparison impossible, due to extreme vagueness of the term 'Western knowledge'. (Is my belief that the sun will rise tomorrow part of 'Western knowledge'? Does such knowledge include the correct beliefs of a Hong Kong scientist, or the true justified beliefs of Moorish merchant in France?).

Moreover, Agrawal repeatedly confuses scientific knowledge with the technical applications of science. He notes the penetration of science-based, technical applications into everyday 'life in the West', and concludes from this that indigenous knowledge cannot be distinguished from scientific knowledge in its specific attention to the 'immediate and concrete necessities of people's daily life-hoods'. However, I believe that we should distinguish between the motivating factors for the development of knowledge and those underlying the application of that knowledge.

No one would dispute the fact that findings which emerge from one area of research are frequently applied in new, often unrelated, areas. Hence the various applications of indigenous and scientific knowledge cannot serve as distinguishing marks between the two. However, the motivation behind the development of these two sorts of knowledge

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[2] See also Heyd T. (1995) 'Indigenous Knowledge. Emancipation and Alienation', *Knowledge and Policy* 8(1):63-73.

does represent a distinction between them–interestingly, precisely in terms of the concrete life context alluded to by Agrawal. For example, the development of iatrobotanical knowledge by Canadian West Coast indigenous people (e.g., on Vancouver Island's Clayoquot Sound) is clearly motivated by 'immediate and concrete necessities', while the development of certain aspect of knowledge concerned with practicle physics by Canadian West Coast scientist (at Vancouver TRIUMF facilities) is not.

Agrawal also question the distinctive significance of the rootedness of indigenous knowledge in specific local context or environments, by comparing it–somewhat incongruously–with the dependence of scientific findings on the context of scientific practice. It is quiet true that sociology of science ('Strong Programme') and certain strand of the philosophy of science have proposed that particular scientific claims are explicable by means of factors like historically specific beliefs and equipment. These various enabling factors can be seen as the 'environment' that made possible certain findings. There is, however, a qualitative difference between the dependence of these scientific findings on their 'environment' and the dependence of indigenous knowledge on its 'environment'.

Physicists' knowledge of practical physics is the result of focusing on certain discipline–internal questions within their subculture and micro-environment, and is largely independent of the broader culture and background of the practitioner. Practical physicists' may be a Muslim from Indonesia or a Mormon from Utah. The iatrobotanical knowledge of the Canadian West Coast Nuuchahnulth, in contrast developed in direct interrelationship with their traditional culture and their ancestral places. In the latter case, 'environment' encompasses the full context of lived experience, as qualified by the broader culture and its values, and the moulding power of place.

Agrawal is nonetheless quite right in his concerns regarding *ex situ* conservation. It is uncertain whether in the long run *ex situ* conservation will benefit the indigenous peoples. I also agree that if the well-being of economically–and politically marginalized indigenous people is really of primary concern, there may be more direct ways in which their interests can be furthered. Notably, indigenous people may find a 'greater voice', and ultimately achieve the *in situ* preservation of their indigenous knowledge, if the management proposals made by them on the basis of their indigenous knowledge, were accorded full legitimacy in policy decisions affecting their land, resources and communities.

D. Michael Warren

In 1980, David Brokensha, Oswald Werner and I were struggling to find a term that could replace 'traditional' in the designation 'traditional knowledge'. In our view, traditional denoted 19th-century attitudes of simple, savage and static. We wanted a term that represented the dynamic contributions of any community to problem solving, based on their own perceptions and conceptions, and the ways that they identified, categorized and classified phenomena important to them. At the same time Robert Chambers and his group at Sussex were struggling with the same issue. Independent of each other, we both came up we came up with the term 'indigenous'.

Now, 16 years later, it is clear that the term 'indigenous' has its own set of problems and misinterpretations, as it translated into a growing array of languages, and a wide variety of academic disciplines get involved in recording knowledge systems important to them. Many of those interested in the role of
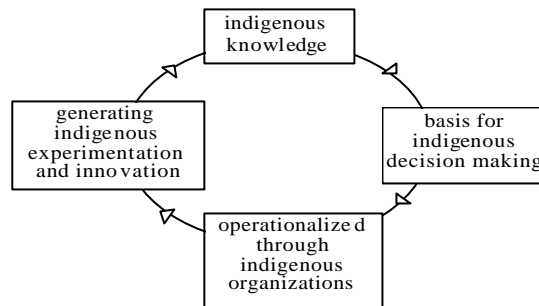
figure 1

indigenous knowledge in development have not had an opportunity to explore the roots of this paradigm shift in international development, or the various methodologies being tested to record these system. These constraints are being tackled by national running their own centres for their own people, and controlling the use of the recorded systems in ways that they feel are necessary and appropriate.

Many case studies exist that have been recorded by persons from a given community or ethnic group. These studies reflect the rich indigenous knowledge resources that have not yet been adequately recognized as contributions to global knowledge. Indigenous knowledge represents generations of creative thought and action within each individual community, as it struggles with an ever-changing set of conditions and problems (see figure 1). All case studies indicate that the mechanisms for changing knowledge system at the local or ethnic level are identical to those that drive the global knowledge system. Individual local-level creativity reflects reactions to perceived problems, as well as the incorporation of external knowledge, technologies and methodologies into the local knowledge system. Each system has its own relative strengths and weakness that are abundantly clear to members of the particular community. Although all of these system exists *in situ,* very few have been recorded so they can be shared with global community. Local people are in a position to define which knowledge can be and should be shared with outsiders, and which specialized knowledge should remain within the local domain.

An understanding of the ways that Yaruba farmers in Nigeria and Benin identify, define, categorize, classify and manage soils as an important natural resources is of great interest not only to Yoruba farmers, but to Nigerian students of soil, and extension agents for other parts of the country working with Yoruba farmers. This is knowledge that can be–indeed has been–compared and contrasted with the categories developed by various scholar active in the academic discipline of soil science in Nigeria. They find it of interest, their students find it to interest, and many of us in Iowa also find it of interest. It is available *in situ* but it is also available *ex situ* in the documentation units and on the Internet.

Thus we are talking about a knowledge system that is now available globally. It will be clear that this is a comprehensive and sophisticated system, comparable to national and international system of soil taxonomy. It is a contribution to global knowledge, and such it should be available in libraries, alongside the millions of other studies by societies with written traditions which exists in *ex situ* form. These systems are not part of the global knowledge system until they have been re-

corded and made available to the global community. They are not inferior to the global system, they have just been generally unavailable. They represent contributions to global knowledge, but until they are recorded no one from outside the particular language group, local community or ethnic group will even know of them. These knowledge systems continue to be devalued in the 1990s.

Agrawal presentations are very valuable. The only disappointment lies in his statements that the distinction between indigenous and global knowledge is 'ridiculous' and a 'sterile dichotomy', that *ex situ* storage of knowledge system creates a mausoleum for knowledge fixed in time and space, that those of us working in this area are interested only in the 'knowledge of the marginalized poor' and that 'Western science is...condemned'. Most of us working in this arena have been trained in scientific method, if not in the sciences. We certainly do not condemn Western science or the development process. We are interested in seeking the universal characteristics of all knowledge systems, in providing a mechanism that will value the contributions of every community to global knowledge, and will change attitudes in such a way that nation states will begin to recognize the most important resource they have–the knowledge generated, but usually ignored, by their own citizens. What is to be recorded and made available *ex situ* for the citizens of the country of discovery and those of other countries, and what is to remain *in situ* and possibly not even recorded in print must be determined by citizens of those communities and nations. This is one of the most important roles of indigenous knowledge resource centres in the various countries. By recording knowledge and making it available to the global community, I am confident that community-based knowledge systems will in the near future begin to be regarded as contributions to global knowledge. Then, at last, the dichotomy between indigenous knowledge and scientific knowledge will indeed be regarded globally as ridiculous.

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The utility of a distinction between indigenous knowledge and scientific knowledge for environmental researchers is not entirely clear. Most environmental problem took many years to develop and are the results of unimagined interactions among highly diverse factors. To analyze these problems, Western science requires qualitative descriptions of the events and process involved. Yet many environmental components have not been measured, which means that there are no qualitative data from which to construct baseline data, calculations of rates of change are complicated and highly contentious. Without clear baseline, it is difficult to distinguish between normal variation and an absolute change in environmental conditions. This situation is perceived as problematic in North America and Western Europe, and virtually insurmountable in the rest of the world. The complaint 'There are no data' supports the claim that in most nations environmental impact assessments cannot be implemented.

The calls up question of whether qualitative descriptions are the only–or even sufficient–forms by which to describe the environment. If they are, then the past environmental function of vast areas of the earth's surface is unknowable. If they are not, researchers should explore alternative sources of information. Focal environmental knowledge and indigenous knowledge have the potential to supply accurate descriptions of visible environmental processes.

When a human intervention in the landscape causes a new phenomenon, there is no

indigenous knowledge available concerning its management or prevention. However, the origin and development of the phenomenon may have been observed and indigenous experimentation carried out to deal with the consequences. Archival material often provides data which support or adjust environmental information derived from local sources. Using these sources of information, the range of expected variability in the pre-disturbance environment can be described. The resulting description can help us to understand the significance of the intervention. This description also provides a basis for monitoring and remedial action.

A framework for understanding human-induced environmental change using local environmental knowledge is provided by historical environmental impact assessment (HEIA). HEIA is patterned on the steps involved in an environmental impact assessment, but reconstructs the effects of past interventions in landscapes (Showers 1995/1996). HEIA favors neither Western science nor indigenous knowledge. Instead, these two systems of data collection are seen as complementary, in the sense that each has its own strengths and limitations. HEIA assumes that knowledge systems are in a constant state of change and requires that practitioners clarify what was known at different points in time. People 'back then' cannot be blamed for ignorance of what we know today.

The environmental consequences of indigenous land use systems have been discussed from the early years of this century, Documents which demonstrate the sustainability of indigenous systems and the degradation resulting from European land use practices and policies in various parts of the world have not been widely disseminated. And yet these findings have been discussed at material for historical environmental impact

assessments and the construction of historical baselines.

Today the debate on the importance of indigenous knowledge and indigenous land use practices is more public than in the past. Proponents of indigenous knowledge systems remain in the minority. The content of the debate, however, has been remarkably constant: economic necessity vs. local traditions and cultural continuity. But the tide may be turning. The effectiveness of the short-term technical solutions once thought to be so effective have had unforeseen negative consequences in the long term. Historical environmental impact assessments facilitate the examination of these long-term effects, and can be used to develop new measures based on indigenous knowledge.

The collection and use of indigenous and local environmental knowledge in environmental research should not denature the knowledge systems. Both indigenous knowledge and Western science are an attempt to characterize and understand the 'universe' of a given society. At any given point in time that knowledge represents a 'best estimate', which will be modified when further evidence is obtained. This means that both knowledge systems are in a constant state of evolution. Both systems have also been developed for their own 'universe', and thus are characterized by areas of greater-and lesser expertise. While environmental problems require a general understanding, many environmental questions depend upon non-generalizeaible site-specific details. This is where indigenous knowledge can make a great contribution. Both indigenous and local environmental knowledge have the potential to advance people's understanding of the environment in all societies.

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R.C. Serrano (Philippine Resource Center for Sustainable Development and Indigenous Knowledge, Los Banos)

I agree with Agrawal that indigenous knowledge should not be distinguished from Western or scientific knowledge. A major characteristic of indigenous knowledge is the fact that it has evolved over a considerable period of time, and that it is identified with a given culture or society. According to this definition, we can say that indigenous knowledge systems and practices must exist among Western cultures, just as in other societies, in particular among so-called indigenous peoples (IPS).

The distinction between indigenous knowledge and Western knowledge is misleading, as is the designation of Western knowledge as 'scientific', which implies that indigenous knowledge is 'unscientific'. The findings of research carried out in the Philippines show that there is scientific significance in many of the knowledge systems and practices of our peoples. While they may not be as elaborate or as eloquently expressed as those encountered in formal science, this does not mean that IK and IK practices are not scientific. In fact, interesting partnerships are now being established between scientists and indigenous farmers, in order to learn from each other and promote fruitful joint undertakings, for example, in the areas of agriculture and natural resources management.

There is evidence of a worldwide snowball effect, as interest in the documentation and preservation of indigenous knowledge systems increases. It must be said that it was not the IPS themselves who conceived the idea of studying their knowledge systems, nor did they attempt to share their knowledge with outsiders. In fact, over the years, these knowledge systems and practices have come under threat through the interference of outside dominant cultures.

While it is logical to want to preserve and document these IK systems and practices, there is a protocol that must be followed by those involved in the electronic documentation of such information. In the first place, they must secure the consent of the indigenous peoples to whom this intellectual property belongs, This is an urgent issue, one that must be settled in an international forum consisting of representatives of IPS, the scientists involved in the documentation of IK, and those responsible for policy and legislation. Like scientific discoveries and inventions, which are usually patented or copyrighted, indigenous knowledge systems can and should be treated as someone's property. Outsiders are not free to make use of them as they see fit; appropriate permission should be secured and due arrangement made with the owners, whether a small group, a community or a society. While regional and global development are noble motives, intellectual property rights must be duly respected, especially in the light of the General Agreement on Tariff and Trade (GATT). The owners' permission should be requested beforehand, and where required, royalties or a remuneration of some kind should be paid. I also agree with Agrawal that if indigenous people are to be able to preserve and apply their knowledge systems and

practices, governments must respect their culture, creating a political atmosphere in which they have sufficient control over their land and resources, and the freedom to decide how and by whom their knowledge is used.

Ladi Semali (Interinstitutional Consortium for Indigenous Knowledge, The Pennsylvania State University)

Dr. Agrawal's questions are important and relevant to me as an IK theorist an educator of indigenous peoples. While teaching in post-independent Tanzania, I struggled like many teachers in African schools to develop relevant and meaningful lessons which met the local needs of students, drawing on examples of the wisdom and history of local people, parents and grandparents. The distinction between indigenous/African and Western/European education was clear. The dichotomy between these knowledge systems did not glorify the similarities. On the contrary, Africans had to find a way to accommodate and make sense of both systems, and as a result the two competed for attention.

As an educator, I am on the front line of the production and reproduction of knowledge in classrooms. Today the 'rhetoric' of indigenous knowledge is important, because it encourages a discussion that has been suppressed for many years by dominant European-centered educational systems. IK 'rhetoric' also stimulates the development of relevant curricula in the area of indigenous knowledge. When I say that curriculum development is concerned with the production of knowledge, I realize that this is a view which goes beyond traditional notions of curriculum as simply a course of study, a compilation of data to be learnt. In the sense I mean here, a curriculum devoted to indigenous knowledge encompasses not only epistemological questions related to both the production and consumption of knowledge, but also the relationship between culture and what is defined as successful learning, the competition between all forms of knowledge production, and the purpose of education itself. I suggest that curriculum studies/curriculum development should devote attention to the process involved in the generation and validation of curricular content, and the fact that some groups of people benefit from the 'certification' of certain forms of knowledge, while other groups do not.

In the age of rapid change, marked by dramatic conflict between the collective good and individual rights, the discussion on values is becoming an increasingly complex and daunting affair. No knowledge system can exist in cultural, economic or political vacuum! On the understanding that power relations cannot be separated from knowledge production, theorists must take seriously indigenous–as opposed to Western–forms of knowledge, avoiding the vast distinction between school and community. For example, Tanzanian schools inherited from the British a colonial system of education, which devalued local knowledge system as 'primitive', and thought students to believe that they were inferior and thus should be satisfied with subservient roles in society (Bray, Clarke *et. al* 1995). These orientation also encouraged students to look outside the community for solutions to problems that were academic among indigenous peoples from food and medicine to irrigation system, from insecticides and mousetraps. Following independence, this orientation had been done away with if the new nation was to become self-reliant. Nyerere (Nyerere 1968:278) points to the contrast between indigenous (local/traditional) and colonial (Western/European) knowledge systems, which in effect represent two separate realities. On the one hand, African students are

immersed from birth in a cultural setting that values the authority of elders and emphasizes practical knowledge. On the other hand, they are schooled in a system in which teachers do little to make classroom lesson relevant to life in African village communities and in which, the authority of elders is devalued and undermined. It is not ridiculous to deny that these are two separate realities?

Since Nyerere's day, this dilemma has not only remained unresolved; it has become further entrenched in the system of schooling. It is the crux of local and global debates about the value of schooling in the context of dissipating ethnic and cultural conflict, and at the heart of the discussion about the possibilities for indigenous communities to participate effectively in their own education programmes. The question reflects the dilemmas created by the concept of indigenous knowledge and the way it competes with other knowledge systems. It makes perfect sense for me as an educator to distinguish indigenous knowledge as a category when examining educational systems as pedagogical sites of knowledge production. This category is made possible by identifying the producers of knowledge as distinct actors. The knowledge so produced is neither neutral nor universal. Even though the literature is imprecise when it comes to defining IK in all the context within which it is produced, the grassroots research emerging from the agricultural sciences, education, geography and natural sciences all point to new awareness and appreciation of local knowledge. African knowledge and its incorporation into solution of ecological problems is a move away from the colonial legacy, which looks outside Africa to countries of Europe and North America for solution to problems endemic to local communities. In this new orientation, which places a high value on local knowledge, indigenous education is characterized as local i.e.,

circumscribed by local history, environment, language and traditions, as well as by African culture. The dilemmas we face in defining are central to the post-colonial debate on the origin of knowledge and the manner, in which it is produced, achieved and retrieved. Advocates of indigenous knowledge, far from assuming that the knowledge of the individual defines for all time, and the ones who have finally recognized that the distinction has in fact been historically created by the West, and is not rooted in ahistorical traits of humankind.

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How to convert the indigenous knowledge debate into something positive ... or how we can have our cake and eat it too.

IU. Kohler-Rollefson (League for Pastoral Peoples, Germany)

Indigenous knowledge has been 'in' for several years now, as witness publications like the *Indigenous Knowledge and Development Monitor,* a network of research centres and data banks, and much more. Now we find Agrawal taking us to task for all this. In his articles[3], he blasts us for appropriating this knowledge and paints a hopeless picture of the future of

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[2] *Development and Change* (1995)26:413-459; *The Common Property Resource Digest* (1995)36:3-5; *Indigenous Knowledge and Development Monitor* 3(3):3-7.

indigenous people. In many ways he is right on track, and the things he has said needed to be said. The widely propagated paradigm that it is to everyone's benefit to feed knowledge about everything from indigenous plant use to indigenous animal breeds into data banks and then make them accessible to 'all' (i.e., those of us in the developed world, who has access to the Internet), is touchingly naive. As Arun Agrawal rightly points out, indigenous knowledge is highly varied and location-specific. What good it is to a Vietnamese farmer to know what his Peruvian colleague is doing is beyond me. Similarly, how the setting up of a data bank on animal genetic resources will actually save a single threatened livestock breed has yet to be explained. It seems that information agglomeration has evolved into a neat figleaf to camouflage our impotence in the face of seemingly unsurmountable problems. Good for scholars, but it is action and practical involvement at the grassroots level that is required to solve the problems of the planet. Ibis brings us right to the central point. Arun Agrawal focuses on the problematic of the IK concept–or the lack of it.

However, it seems to me that by asserting that indigenous and 'western' or 'scientific' knowledge has been depicted as opposites, he is setting up a strawman for subsequent dis-mantling. Indigenous knowledge is the practical knowledge and experience of people who still have a direct link to the 'soil' and their immediate environment. This is why con-trasting indigenous and Western knowledge is moot; it is like comparing apples with oranges. For one thing, it implies that there is no indigenous knowledge in Western culture, and that non-Western culture has no scientific or 'book' knowledge. Where in such a classification system would be place the kitchen garden skills of German farmwomen or ayurvedic medicine and acupuncture?

What term indigenous knowledge usually signifies is exotic practical knowledge, i.e., practical knowledge encountered in cultures not our own. It is significant that the term indigenous knowledge was coined by social scientist, i.e. anthropologist who were apparently astounded that the people they were dealing with knew many things they themselves had never been exposed to, such as practical knowledge about the earth and the environment, and were able to make plants and animals grow and flourish. As good anthropologists they projected this aspect of traditional cultures and in the process it become surrounded by a certain mystique. By contrast, graduates of discipline such as agriculture and veterinary medicine have always been aware of the existence of a vast body of local knowledge and folk wisdom. However, they have rarely appreciated it, viewing it more as something to be eradicated.

As a rule, there is nothing mystical about indigenous knowledge; it may appear so be-cause it entails the honing of sensory skills that are not exercised in the course of academic study: they therefore degenerate or never develop in the first place. Indigenous knowledge is gained by experience, practical immersion, and often back-breakingly hard work, within a context of repetitive boredom. It is a prerequisite for survival for the majority of the world's rural population: it is learned by doing, not by reading or following a course. It is knowledge that is subject to permanent testing and refinement, and must constantly prove its worth. All this sets it apart from book knowledge which may just sit there for hundreds of years without ever being put into practice. Thus practical knowledge is a *sine qua non* for anyone who lives off the land. With practical knowledge alone a farmer can survive, whereas mere book knowledge will not enable anyone to grow crops or raise livestock. This

is why indigenous knowledge will always be fundamental to rural development, and why any effort to dispense with it will fail. The problems arise when people with book knowledge think that they know it all–a situation which is perpetuated by universities and institutions of higher learning.

If I am getting somewhat hot under the collar over this, it is probably because of my recent experiences in the context of camel husbandry development project for pastoralists in India. The aim was to find ways to better the economic situation of the traditional pastoralists, and at one point we hit on the brilliant idea of availing ourselves of the services of a conventionally trained veterinary doctor who could help us to improve the health of animals. A bitter disappointment awaited us. The yawning gap between the representatives academe and the protagonist of indigenous knowledge become obvious as soon as they set eyes on one another. The first comments made by one vet by seeing a migratory camel herd were predictable: 'why are these people keep their camels in an open field? Are they don't giving them any housing?', followed by 'these people are not giving their animals a balanced feed. If they don't know how to calculate a ration for their camels, how can we help them?' Little did the vests know that the Raikas distinguish some one hundred different forage plants; they know the different effects they produce in terms of milk yield, and in fact base their migrations of the seasonal availability of such plants. The vests themselves lacked the necessary training to identify even one of the crop plants grown in the area. Another vet tried to mesmerize me by rattling off long lists of Latin plants names (getting them all wrong), even though he could not tell a lentil of a linseed. This is not an exaggeration, We had to stop bringing in the academics, because they proved too much of an embarrassment to the project.

All this ignorance would not be so bad–it can, after all, be remedied-if it were not coupled with a quite startling degree of arrogance. I could not concur more totally with the comments of Dr Kroma (1996:13-16) to the effect that book knowledge and schooling undermine the appreciation of practical indigenous knowledge. However, although indigenous knowledge will always remain basic and fundamental to sustainable land utilization, we must also be aware that it has its limitations, and that there are many situations in which it is not actually useful. For instance, certain major animal diseases cannot be brought under control using traditional methods alone. There is a clear need for the discriminating merger of indigenous knowledge with scientific academic knowledge.

What all proponents of indigenous knowledge must work on is constructing this interface between the two knowledge systems. This will entail making room in the academic curriculum for exposure to indigenous knowledge and getting academics to respect indigenous knowledge. More interactions between the converted (anthropologists) and the conservative (agricultural scientists, etc.) are also required. At the same time we must download useful aspects of academic/scientific knowledge, and make it not only applicable, but also palatable to local people. There is nothing wrong with studying indigenous knowledge if at the same time we reciprocate in kind, taking the time to impart relevant parts of our own knowledge system. Communication with indigenous peoples must be two-way affair.

If we all try to do this within the various scenarios open to us, then I believe that this may be useful to all those concerned. In this sense, we may be able to have our cake, and eat it too.

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Farmers, extensionists and the relation between indigenous knowledge and scientific knowledge in extensive livestock production: experiences from Latin America

Katrin van 't Hooft (Cichabamba, Bolivia)

Agrawal's statement that we must move away from the sterile dichotomy between indigenous and scientific knowledge is absolutely valid for farmer groups in both Bolivia and Nicaragua! In their extensive livestock keeping, the six farmer groups studied all combined indigenous knowledge and scientific knowledge in some way or other.

On the other hand, for the farmers involved there is a clear distinction between indigenous and scientific knowledge and practices. This has to do with the availability of the products involved in each of these practices. Indigenous knowledge is based mainly on locally available products which, while they have a certain market value, can also be obtained within the traditional market system. Products, which are rooted in scientific knowledge, require a monetary investment, must be introduced into the capitalist market system, and are depended on manufactured products. In short, to obtain these articles, one must enter a shop and pay money for them.

Today many rural communities in the Third World are facing changes and many kinds of insecurities: economic, cultural, market, social, political and ecological. Moreover, the move towards a market oriented economy, which constitutes a political decision by governments in many countries, is accompanied by high costs for the rural communities. An increase in the 'modern' aspirations of farming families is part of this reality, resulting in a growing desire for a cash income. Massive migration to other ecological zones or urban areas is one of the options.

Other possibilities include adapting one's agricultural strategy. Against this background, the balance between indigenous knowledge and scientific knowledge in agricultural production is starting to change, as farmers begin to experiment with new possibilities. This is a process, which will have different results for each farmer, depending on his individual interests and possibilities. Thanks to these experiments, farmers are now realizing that it is possible to combine their indigenous knowledge with elements of scientific knowledge.

Outsiders such as technicians and extensionists should focus on assisting farmers in this process of finding a new balance between indigenous and scientific knowledge in their production strategy. Together they should analyze the available options, leaving the actual decisions to the farmers, and giving them an opportunity to experiment. Technicians in the service of farmers and farmers' organizations should strive to optimize the relationship between the two knowledge systems within agricultural productions. In this approach, the role of the technician or extensionist does not consist in acquiring and evaluating as much knowledge as possible (whether indigenous or scientific), deciding on the strategies to be followed, and finally returning these to the farmers as a package, which they are free to adopt or reject.

Instead, while technicians should contribute their own–predominantly scientific–knowledge to the strategy discussion, it is ulti-

mately the farmers who will evaluate the completed experiments and decide on new ones. The results will be different for each case, each situation, each family and each individual. The fact that technicians offer farmers scientific knowledge is not in itself a bad thing, and many farmers are eager to learn from them. However, the technicians or extensionists are only one of many possibilities for farmers to gather knowledge and make decisions, and they must see themselves in this perspective.

Although it is not my intention to question the value of indigenous knowledge, I would like to stress the importance of elements of scientific knowledge in combination with indigenous knowledge. This is especially true in extensive livestock production, where indigenous knowledge is often powerless to deal with the high mortality rates. The experiments of the farmers show us the way. However, the scientific world in Latin America is not entirely ready for this change. For example, it is often difficult to find formal research findings on infectious and parasitic diseases of the species used in extensive livestock production. Moreover, in both Nicaragua and Bolivia, the oral vaccine against Newcastle disease (major infectious disease among chickens), which is suitable for small-scale chicken production is not available on the market.

Moreover, in spite of certain positive developments, the curricula of agricultural schools and universities in many Latin American countries remain basically scientifically oriented, and based on Northern–thus intensive–methods of livestock keeping. Elements of family level extensive livestock keeping and indigenous knowledge are more often ridiculed than welcomed, while the role of the technician is automatically considered to be superior to that of the farmer.

Therefore, I agree with Arun Agrawal that 'it is necessary to attempt to reorient and reverse state policies to permit members of threatened populations to determine their own future', but not only with the objective 'to facilitate the *in situ* preservation of indigenous knowledge'. I argue that state policies should also stimulate scientific knowledge which is adapted to small-scale agriculture and livestock production, both in agricultural education and research. At the same time, farmers' organizations and technicians should start working on improving the balance between indigenous and scientific knowledge, order to leave decisions where they belong: in the hands of the farmers.

Indigenous Knowledge and Development

Carmen G. Hess (University of Hohenheim, Germany)

In his article Agrawal tries to uncover contradictions and conceptual weaknesses in the literature on indigenous knowledge (IK) and scientific knowledge (SK). I welcome this opportunity to review and synthesise IK research, which is based on the perspectives of numerous disciplines, and experiences in many countries. However, the usefulness of Agrawal's critique is seriously hampered by two shortcomings. First, he misrepresents the contributions of IK research by placing it in opposition to the so-called 'hard sciences' and, second, he bases his argument on an erroneous definition of IK.

In discussing SK, Agrawal draws upon debates on the history and philosophy of science, which are concerned with the so-called hard sciences, such as astronomy, astrophysics, chemistry and biology. But, the SK involved in development is also rooted either in the environmental, agricultural, veterinary and economic sciences, or in nutrition, forestry,

engineering, pedagogy and health care. These disciplines differ from the hard sciences in that they cannot pin down complex social realities in laboratory experiments, or achieve the required predictability and control of events and processes (Schoenhoff 1993:37). IK research scrutinizes the utility and the role of development-related sciences, which must take into account social and cultural factors. Thus the attention of IK research is directed towards the encounter between the softer sciences and local expertise.

My second bone of contention is that Agrawal's characterisation of IK as closed, non-systematic or fixed knowledge does not correspond to contemporary–or even past-definitions. In a collection of essays on indigenous knowledge systems edited by Warren *et al.* (1995), IK is defined as 'basically local knowledge that is unique to a given culture. It is the information base for a society which facilitates communication and decision-making. Indigenous information systems are dynamic, and are continually influenced by internal creativity and experimentation as well as by contact with external systems.' (Flavier, *et. al.,* 1995:479).

Both contentions are fundamental to my criticism of Agrawal's argumentation. I suggest that further discussion of IK research tan best be advanced by focusing on the relationship between IK and development. First, I regard the term X as a contribution to development thinking. In comparison with such labels as 'beliefs', 'customs', 'traditions' or 'modes of thought', the term 'indigenous knowledge' respects the expertise of indigenous peoples. The evidence that indigenous knowledge is often scientifically correct (e.g., Richards 1985), has helped to legitimize it. However, this is not the only argument that can be put forward to demonstrate that poor people are knowledgeable. IK theory is indebted to Freire's pedagogy of liberation (1984) for the recognition that the acceptance of: people's views are a precondition for true dialogue and cooperation. This insight, together with the failure of technocratic and econometric approaches, has toppled the once dominant concept of technology transfer. Instead, there is growing awareness that researchers and extensionists should be facilitating the generation of local solutions to local problems.

Second, the importance of local expertise and culture stimulates the creativity of IK methods and objectives. Pretty (1995), for example emphasises the need for 'new systems of learning' and 'new systems of action' aimed at fostering sustainable agriculture. In the same vein, Cernea (1995) argued in his Malinowski award speech that social scientists need 'knowledge for understanding' as well as 'knowledge for action', if they are to make useful contributions. Pérez de Cuéllar (1995:4 5), in a recent report of the World Commission on Culture and Development, maintains that 'the challenge to humanity is to adopt new ways of thinking, new ways of acting, new ways of organising itself in society, in short, new ways of living'.

Participatory IK research methods can be instrumental in improving our capacity for understanding and cooperation across cognitive and cultural differences. It is also important to devote more attention to improving our communication skills. Cultural and communicative competencies are crucial when it comes to generating consensus and momentum for joint action (Freire, 1984; Habermas, 1984; Hess, forthcoming). A certain amount of soul searching on the relation between knowledge, communication and action Fill help us to further strengthen the role that indigenous peoples and indigenous knowledge play in fostering innovative paths to development.

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To a large extent I agree with Agrawal when he says that both types of knowledge have elements that go beyond the simple day-to-day activities that both types can be handled as open or closed, and that it is the context of any knowledge that determines its value or bias. Efforts to document, archive, assess, validate, classify and disseminate indigenous knowledge, however well intended, not only fail to do justice to indigenous knowledge, but also contradict the dynamic nature of knowledge in general (whether Western or otherwise). Information can be managed, but knowledge is a creative process in the minds of people: it has its own dynamics and is largely uncontrollable, due to the important role played by values, learning experiences and inspiration.

Although large parts of the world have been affected by Western science and technology and the Western political and economic system, we must not forget that in many societies, both Western and non-Western, people adhere to their own social and spiritual system. Many people, educated as well as uneducated, go to a doctor trained in the West as well as to a spiritual or traditional healer; many farmers in the West as well as in the South, apply technologies such as fertilisers, but continue to perform age-old rituals in honour of their gods, ancestors and spirits;

many scientists take an interest in art or religion. This blend of reductionistic materialism/rationalism and holism is more widespread than conventional science is perhaps aware, as its measuring instruments are only equipped to observe, process and interpret the material aspects of such developments.

The worldwide impact of the application of Western science and technology in terms of welfare, health and ecological sustainability has not been exclusively favourable. Western societies have gained material welfare, but are also faced with social alienation, mental health problems and environmental pollution. Problems such as population growth, poverty, overexploitation of natural resources, and the disintegration of institutions, also occur in non-Western societies. No knowledge system has yet come up with the ideal ingredients for shaping technology development or creating the ideal society. Humankind has a limited potential to comprehend the complexity of reality: there are simply too many variables.

In my view, neither romanticizing indigenous knowledge nor condemning Western knowledge–or the other way around, for that matter–is a constructive way of coping with present-day problems. And neither *in situ* preservation nor *ex situ* conservation of knowledge appears to be an attractive prospect. All knowledge, whether it originated in the West, East, South or North, has its own dynamics. And everyone has the capacity to learn, un-learn, interpret, re-interpret, and form and revise opinions Thus the basic challenge is not conservation, preservation or a shift in power relations from one extreme to the other. One of the lessons to be learned from an evaluation of the myriad applications of science and technology worldwide is the need to exercise restraint in the expression of our convictions; this means that we should be prepared to listen to and to learn from others.

Rather than the conservation or preservation of knowledge, be it *in situ* or *ex situ*, I advocate an intercultural dialogue between scientists, spiritual leaders, technicians, managers and users of natural resources, and political leaders. An open dialogue on the cosmovision, scientific methods, and criteria for technology development between traditional communities in Africa, Europe, America, Australia or Asia, between spiritual leaders and scientists, between reductionist and holistic scientists, would seem more appropriate than a debate on Western versus non-Western science.

Does Western/modern science occupy a special position? I believe it does. In the past few decades enormous effort has been devoted to enhancing Western knowledge, and the application of Western technologies throughout the world has been extensive. The colonial and post-colonial periods have led to huge surpluses; which have in part been reinvested in the development of science and technology. The results cannot be disregarded. Instead of being further enhanced and enriched, many non-Western knowledge systems have been neglected, they have received less attention and earned less prestige, major elements have been lost, and in some cases these systems have been marginalized.

It is my view that Western knowledge systems can learn a great deal from their non-Western counterparts, as well as vice versa. The debate between Western and indigenous knowledge is irrelevant where it focuses on documentation with a view to conservation, or is limited to descriptions of technologies, without regard for the values and internal logic of local farmers or traditional leaders. The issue of diverse sources of knowledge should rather be seen as an opportunity to learn from each other, and work towards the synergy which flows from intercultural dialogues.

Basga E. Dialla (Burkina Faso Resource Centre for Indigenous Knowledge, Burkina Faso)

The article raises crucial issues that need to be seriously considered. It is right for such views to be expressed from time to time, in order to 'shake up' established thinking on indigenous knowledge.

The initial distinction between indigenous knowledge and scientific knowledge made by IK theorists may be seen as the first step, Such a distinction is not rigid, but rather stresses the importance of sound, useful and relevant knowledge that has been ignored for many years. Not only is the distinction between indigenous knowledge and scientific knowledge a vital step forward in focusing attention on the importance of indigenous knowledge, it also opens the way for a further investigation of the complementarity of the two categories of knowledge, and the differences within each.

D.W. Brokensha (Institute for Development Anthropology)

The main conclusions in the article would be more valid in an ideal world than in present-day reality For example, Agrawal questions 'the presumed distinction between indigenous and Western knowledge', advocating a 'move away from (this) sterile dichotomy. My reservation stems from the fact that nearly all the main actors in development, such as agronomists, economists, foresters, lawyers 'mission directors', project managers, and their counterparts in the developing countries are still convinced of the superiority of Western knowledge. When a weak company is merged with a powerful institution, the weaker one disappears, or loses its identity. In the same way, if the distinction between indigenous and Western knowledge were to be 'removed' (how this would be done is unclear), then there

is no doubt that indigenous knowledge would be the loser, and would virtually cease to exist.

Agrawal also states that 'those who... possess indigenous knowledge must also possess the right to decide on how to conserve their knowledge, and how and by whom it will be used'. My point is that there is, alas, no must here. We may all agree that this state is desirable, but ail we can say–weakly–is that such people should have that right.

Perhaps inevitably, in such a summary article, both indigenous knowledge and Western knowledge are treated as homogeneous entities. All the multiple gradations in each differences in validity, applicability, sophistication, universality, etc.– are ignored.

Finally, I regard those of us who promote indigenous knowledge as missionaries, people with a mission to convert the 'heathens', those who do not accept the value of indigenous knowledge nor its potential contribution to development. I held this view thirty years ago, and Agrawal has not persuaded me that I should change it now.

Tanggapan A. Agrawal (*IKDM* 1996:17-18)

The responses to my short paper on the presumed distinctions between indigenous and scientific knowledge were wide-ranging. In tone, they run the gamut from those who more or less agree with the points I made (Serrano) to those who disagree with more or less everything I suggest, but are too kind to actually say so (Brokensha), I am grateful for this occasion to offer a response to the comments.

My reply would ill serve the dialogue if it

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[3] Hess suggests that I characterized indigenous knowledge as closed; Brokensha believes I am saying that Indigenous and Western Knowledge are homogenous. I make no such assertions.

[4] Thus reasons why simmilar questions might become important for practicle physicists (whether Mormons or Muslims) and various botanical questions are relevant to dif-

were to remain preoccupied with clarification and elaboration. Therefore, while some of the letters criticize claims I do not believe I made (Hess, Brokensha [4]), and some others operate on quite different assumptions, in that they locate: the : relevance of knowledge in appropriate communication (Showers, Hooft, Haverkort, Dialla), I would like to take this opportunity to transfer the conversation to a different plane.

The deeply *political* nature of the points I made in the article is reflected in the split between various respondents over specific issues. They do not agree on how indigenous knowledge is different from scientific knowledge, whether *ex situ* conservation should be promoted, whether conservation itself is meaningful, etc. Interestingly enough, even while they disagree among themselves over, say, the degree of difference between indigenous and scientific knowledge, they also disagree with me. Heyd takes me to task on the specific question of whether scientific knowledge can be separated from indigenous knowledge on the basis of its relationship to the environment. (At the risk of oversimplifying things, he says 'Yes', I say 'No' [4]). Warren, on the other hand, agrees that scientific and indigenous knowledge may indeed have many things in common. But Heyd finds my points about the *ex situ* preservation of knowledge valuable, while Warren believes precisely these points into be the most troubling.

In view of all the differences among the responses, it seems that the most significant issue I was attempting to raise, an issue that remained implicit in my own short paper, received little attention from my interlocutors. The critical difference between indigenous and

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ferent indigenous groups, may be far more closely related to levels of professional specialization within these groups and level of communication among scientists than to inherent differences between these type of knowledge.

scientific knowledge is not at an epistemological level: rather it lies in their relationship to power. This is a point which many of the responses hint at, only to leave it ultimately unexplored. Warren tantalizes this readers by referring to the devaluation of indigenous knowledge; Serrano talks about the threat which outside *dominant* cultures represent to indigenous knowledge; Semali brings up Nyrere's distinction between indigenous and colonial by mentioning traditional authority and its devaluation; Köhler-Rollefson describes the doubly disappointing ignorant arrogance of conventionally trained veterinarians; and Brokensha metaphorically argues against mergers between power and weaker institutions. But let us come to the heart of the matter. As Brokensha rightly implies, the question is one of power. Who has access to resources and can deploy them in order to disadvantage others?

Clearly, it is not the holders of indigenous knowledge who exercise the power to marginalize. Indeed, no matter how you slice the cake, the criterion of power will triumph when local, traditional, or practical knowledge is contrasted with global, modern, or theoretical knowledge. To this extent, and only to this extent, the attention to 'indigenous,' the adoption of the idiom of the 'indigenous,' and the attempts to direct resources toward the 'indigenous' can and must be welcomed.

But if the issue centres on power, and on a redefinition, renegotiation, realignment, and reallocation of the social relations of power, it must be acknowledged that some of the strategies advocated to favour the 'indigenous' are likely to be ineffective. The strategy which involves researching, documenting, classifying, correlating, archiving and systematizing indigenous knowledge (thereby supporting the marginalized, the oppressed and the weak) focuses on symptoms, rather than on the

underlying reasons why indigenous knowledge is disappearing. It focuses on and reifies knowledge as existing and evolving in an objective, unbiased fashion. Indeed, it might prove to be of more help to the strong than to the weak. It highlights the politics of the possible: this is the feasible, the convenient, but it also the ineffective option. It may not be necessary to give it up, but to treat it as the main, or the only, way to empower those who possess indigenous knowledge is to go along with the contradiction of one's avowed aim of empowering indigenous communities.

The empowerment of those groups that are under threat may involve lobbying actors within the government; it may require shifts in policies that endanger the decision-making and livelihood of indigenous peoples, or necessitate alliances rendered impractical by too strict a separation between indigenous and Western. And finally, it may imply a far more active mobilization and organization of people whose knowledge is being lost. These steps may be impractical for academic researchers, or even impractical in general. However, it makes little sense to maintain that storing knowledge in archives and libraries will bring about what should be happening with that knowledge. As Köhler Rollefson puts it, 'it is action and practical involvement at the grassroots level that are required'. I would modify her words to stress that such involvement is necessary at multiple levels.

Ecology Anthropology

The first stage: 1930 - 1960 – Cultural Ecology

- Julian Steward (UC Berkeley) and Leslie white (Univ of Chicago)
- Muncul sebagai reaksi dari paradigme cultural evolution (Morgan, Taylor, dll di abad 19).
- Cultural ecology menolak asumsi "all cultures could be placed in a small number of stages and that cultures tended to move through these stages in a relatively fixed sequence."
- Steward melihat ada peran lingkungan mempengaruhi terbentuknya culture

- environment influenced certain element of "culture core"
- He was interested in "finding what…'regularities' or similarities between cultures that recur in historically separate or distinct areas of traditions, and which may explained as a result of similar environment features."
- Key concept: adaptation, evolution
- Functionalism perspective

Second stage: 1960 - 1970

- Muncul dua kelompok
- 1) neoevolutionist – Steward and White were both correct;
- 2) neo-functionalist – who argued that Steward and White were both wrong.

Neoevolutionism

- Mereka mendukung Steward dan White
- Fokus nya pada penerapan teori evolusi Darwin (namun beda dengan cultural evolutionalism yang dianut peneliti sebelumnya spt Taylor dan Morgan
- Mereka mengadopsi teori evolusi untuk memahami evolusi dari society, kemunculan budaya pertanian hingga ke pembentukan negara.
- Unit analysis: cultures

Neofunctionalism

- Associated with Marvin Harris dan pemikiran awal dari Andrew Vayda dan Rappaport.
- Para peneliti terpusat di Universitas Columbia dan Michigan
- They see "social organization and culture of specific populations as functional adaptation which permit the populations to exploit their environment successfully without exceeding their carrying capacity."
- Unit analisisnya: populasi yang beradaptasi dengan lingkungan
- Harris concerned with casuality; Vayda dan Rappaport concerned with system functioning)

- "neofunctionalists explain specific aspects of social organization and culture in terms of the functions which they serve in adapting local populations to their environments."
- Pendekatan ini mencoba memahami "the interaction between environments and populations rather than treating the environment as a passive background which spapes culture but is not influenced by it, and their methodology is more explicit, rigorous, and quantitative than [the neovolutionists)
- Banyak meminjam istilah biology: adaptasi, niche, carrying capacity.

- Ke dua pendekatan itu sama-sama melihat bahwa manusia adalah bagian dari fungsi ekosistem alam. Interaksi manusia dengan alam mirip dengan interaksi makhluk lainnya dengan alam.

- Mereka juga mengikuti berbagai asumsi para biolog/ekolog yang menekankan pada survival dan reproduksi sebagai tujuan dari hidup organisma.

- Mereka juga menekankan bahwa tekanan penduduk adalah salah satu mekanisme prinsip yang menyebabkan adanya perubahan.

- Mereka juga beranggapan bhw "systems should tend toward homeostatic equilibrium with populations at or close to carrying capacity; population growth above these limits induce change."

Kritik terhadap dua pendekatan itu

- Mengabaikan adanya faktor motivasi dan nilai-nilai (values) yang melatarbelakangi orang bertindak
- Functionalist fallacy – "incorrect in attempting to argue that human populations remain at or below carrying capacity, since they miss the cases of populations which cause significant damage to their environments."
- Ecological reductionism – "tend to assume that particular aspects of social organization and culture serve specific functions in adapting local population to their environment." "...tend to present social organization and culture as unstructured sets of practices and beliefs rather than as processing internal coherence."
- Assume energy is the onely limiting actor that limit population growth or social complexity.

- Fokus unit analisis pada populasi . Asumsi bahwa "local populations being in homeostatic equilibrium" sulit dibuktikan. Unit analisis pada populasi mengabaikan fakta peran dari individu, jaringan individu dan relasi diantara mereka dalam konteks sosial, ekonomi, dan politik.

Third stage – 1970 – 1980an: Processual Approach

- "examine shifts and changes in individual and group activities, and they focus on the mechanisms in by which behavior and external constraints influence each other."

- "The importance to incorporate the decision making model into ecology anthropology"

- Dipengaruhi oleh actor-based model. Pendekatan ini berpengaruh dalam cara pandang melihat populasi "…from treating populations as uniform to examining diversity and variability within them, and from normative and jural aspects to behaviour aspects of social relations."

- Menekankan pendekatan sejarah dalam proses analisis

Advantage of actor-based approach

- Dapat melihat adanya organisasi sosial yang lebih luas – misalnya network dari individu yang berbeda etnik, geografi, class..etc.
- Dapat melihat variasi dari tindakan dalam suatu populasi
- Dapat lebih melihat konflik dan kompetisi.
- Dapat melihat potensi dari adanya perubahan dengan cara menganalisis sejumlah proses yang mengahasilkan relasi sosial, ekonomi, dan politik diantara individu
- Dapat melihat berbagai opsi pengambilan keputusan di tingkat individu yang mempengaruhi dan dipengaruhi oleh relasinya dengan alam

Komponen dari processual Ecological Anthropology

- Demographic decision-making models – misalnya menganalisis kaitan antara tekanan penduduk dan intensifikasi dalam pertanian.

- Environmental problems – salah satu pelopor adalah Andrew Vayda dan Bonnie McCay yang focus pada kajian melihat respon individu dan populasi terhadap tekanan lingkungan. Upaya untuk memperlihatkan variasi dari respon pada tingkat individu dan tingkat kolektif ketika menghadapi disaster sprt kelaparan, kekeringan, bencana alam etc.

- Adaptive strategies – melihat berbagai variasi adapatasi pada tingkat individu sebagai respon terhadap masalah lingkungan
- Marxism – melihat pentingnya pengaruh ekonomi politik dalam pengambilan keputusan – tahun 1980an.

Post-1980an - Terbentuk dua aliran

- Human ecology – lebih membangun dialog dengan ilmuwan biologi dalam mengembangkan kajian yang fokusnya pada energy flows, knowledge systems, subsistence, dan adaptation.

- Anthropology political ecology – menggunakan actor-based, decision-making model yang digunakan dalam processual ecology anthropology dan mengkombinasikan dengan perspektif ekonomi politik (pengaruh Marx). Kelompok ini lebih membangun dialog dengan human geografi. Kajiannya lebih fokus pada claims, rights, power, dan conflict.

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The New Ecological Anthropology

Older ecologies have been remiss in the narrowness of their spatial and temporal horizons, their functionalist assumptions, and their apolitical character. Suspending functionalist assumptions and an emphasis upon (homeo)stasis, "the new ecological anthropology" is located at the intersection of global, national, regional, and local systems, studying the outcome of the interaction of multiple levels and multiple factors. It blends theoretical and empirical research with applied, policy-directed, and critical work in what Rappaport called an "engaged" anthropology; and it is otherwise attuned to the political aspects and implications of ecological processes. Carefully laying out a critique of previous ecologies by way of announcing newer approaches, the article insists on the need to recognize the importance of culture mediations in ecological processes rather than treating culture as epiphenomenal and as a mere adaptive tool. It closes with a discussion of the methodologies appropriate to the new ecological anthropology. [*"the new ecology," political ecology, applied or engaged anthropology, linkages methodology*]

Ecological anthropology was named as such during the 1960s, but it has many ancestors, including Daryll Forde, Alfred Kroeber, and, especially, Julian Steward. Steward's cultural ecology influenced the ecological anthropology of Roy Rappaport and Andrew P. Vayda, but the analytic unit shifted from "culture" to the ecological population, which was seen as using culture as a means (the primary means) of adaptation to environments. Columbia University can be identified as the birthplace of ecological anthropology and the related cultural materialism of Marvin Harris, which, however, drew as much on Steward's concern with culture change (evolution) and culture core as on his cultural ecology. More diachronically and comparatively oriented, cultural materialism shared with ecological anthropology an interest in the adaptive functions of cultural phenomena, including religion (e.g., Rappaport's [1968] focus on ritual in the ecology of a New Guinea people and Harris's [1966, 1974] analysis of the adaptive, conservatory role of the Hindu doctrine of *ahimsa,* with special reference to the cultural ecology of India's sacred cattle).

The ecological anthropology of the 1960s was known for systems theory and negative feedback. Cultural practices were seen as optimizing human adaptation and maintaining undegraded ecosystems. Factors forcing us to rethink old assumptions today include population increase and high-tech-mediated transnational flows of people, commerce, organizations, and information. The new ecological, or environmental, anthropology blends theory with political awareness and policy concerns. It attempts to understand and devise culturally informed solutions to such problems/issues as environmental degradation, environmental racism, and the role of the media, NGOs, and environmental hazards in stimulating ecological awareness and action. While recognizing that local and regional systems are permeable, the new ecological anthropology must be careful not to remove humans and their specific social and cultural forms from the analytic framework.

The following reviews the salient features of the old ecological anthropology, setting the stage for an exploration of important aspects of an emerging new ecological anthropology.

The Old Ecological Anthropology and Its Units of Analysis

The ecological anthropology of the 1960s was known for its functionalism, systems theory, and focus on negative feedback. Anthropologists examined the role of cultural practices and beliefs in enabling human populations to optimize their adaptations to their environments and in maintaining undegraded local and regional ecosystems. Various scholars (for example, Friedman 1974) attacked both ecological anthropology and cultural materialism for a series of presumed faults, including circular reasoning, preoccupation with stability rather than change and simple systems rather than complex ones, and Panglossian functionalism (the assumption that adaptation is optimal—creating the best of all possible worlds). Rappaport's distinction between cognized and operational models was related to ethnoscience, which grew out of linguistics but became

another expression of the ecological anthropology of the 1960s. Flourishing at Stanford, Yale, Pennsylvania, and Berkeley, ethnoscience focused on cognized rather than operational models and on classification rather than action, and it received some of the same criticisms just mentioned for ecological anthropology.

The basic units of the ecological anthropology of the 1960s were the ecological population and the ecosystem, treated, at least for analytical purposes, as discrete and isolable units. The comparable unit for ethnoscience was the ethnosemantic domain (for example, ethnobotany, ethnozoology, ethnoforestry). Assumptions of the old ecological anthropology, now clearly problematic, are apparent in some of its key definitions—most importantly ecological population and ecosystem.

Rappaport defines an ecological population as "an aggregate of organisms having in common a set of distinctive means by which they maintain a common set of material relations within the ecosystem in which they participate" (1971a:238). Several elements of this definition must now be questioned. Given contemporary flows of people, information, and technology across cultural and social boundaries, how *distinctive* are the cultural adaptive means employed by any group? Given the fact and recognition of increased diversity within populations, how *common* is the set of material relations within ecosystems? Nor do most people today participate in only one ecosystem.

Rappaport also characterizes ecological populations as "groups exploiting resources entirely, or almost entirely, within certain demarcated areas from which members of other human groups are excluded." Similarly, he defines ecosystem as "the total of living organisms and non-living substances bound together in material exchanges within some demarcated portion of the biosphere" (1971a:238). Rappaport's case example of a local ecological population was the Tsembaga Maring, a local territorial group comprised of 200 tribal people living in colonial New Guinea. But in today's world full of rural-urban and transnational migration, and ensuing remittances, how many groups subsist almost exclusively on local resources? How many human groups live in precisely demarcated ecosystems that are free of intrusion by others? To be sure, Rappaport was careful to recognize regional as well as local ecological populations and ecosystems. He noted in 1971 that local ecosystems are not sharply bounded and that their discrimination rests to a considerable extent on the aims of a particular analysis. Thus, "local ecological populations . . . participate in regional exchange systems composed of several or many local populations occupying a wider geographic area" (1971a:251). In fact, the articulation of local and regional ecosystems was an important part of Rappaport's famed account of the ritual cycle in the context of Maring warfare and land use. His *Pigs for the Ancestors: Ritual in the Ecology of a New Guinea People* (1968) became the classic case study of human ecology in a tribal so-

ciety, the role of culture (especially ritual) in local and regional resource management, negative feedback, and the application of system theory to an anthropological population.

However enlightening Rappaport's analysis may have been for understanding Maring adaptation, the limitations of such an approach for the study of more complex societies were apparent even in the 1960s. I had to confront them as I planned my own ecological study of the Betsileo of Madagascar, a much more populous group with a much more complex (chiefdom/state) sociopolitical organization. In *The Past in the Present: History, Ecology, and Cultural Variation in Highland Madagascar* (Kottak 1980), a large-scale comparative and historical study based on fieldwork done in 1966 and 1967, I attempted an ecological analysis of the Betsileo—some 800,000 people distributed over a much larger territory than the Tsembaga Maring. Combining ethnography with survey techniques, I evaluated ecological adaptation (of the Betsileo and other Malagasy) by focusing on associations or bundles of interrelated material variables (correlations across time and space) rather than by trying to define and demarcate precise local ecosystems. The categories of material conditions I (like Rappaport) considered included aspects of the physical and biotic environments and such regional factors as trade and warfare, but they also extended to the role of stratification and the state in determining differential access to strategic and socially valued resources. Clearly, the ecological analysis of state-level societies could not be the same as that of bands and tribes.

Madagascar also raised the complicated question of the relation between culture (ethnicity), ecology, and the state. Fredrik Barth (1958, 1969) had postulated that, especially when there is niche specialization plus exchange, convergence and assimilation of contiguous ethnic groups are not inevitable; ethnic distinctions can be maintained over time. I noted that abrupt environmental and ethnic shifts have been possible in Madagascar. For example, when people moved to a certain area of Madagascar's forested eastern escarpment, they became Tanala, which means "people of the forest." (This, by the way, is no longer as clearly true.) Here, an ethnic label seems to have corresponded fairly closely to an ecological distinction.

But such correspondence was not generally true in Madagascar, where ethnic labels owed more to the political situation than to the natural environment. Within territorially large and populous "ethnic groups" (e.g., Betsileo, Merina, Sakalava), there is considerable variation in environment, modes of production, and means of adaptation. Also, the existence of ecoclines—regions of gradual rather than abrupt shifts from one set of ecological variables to another—makes it difficult to claim a neat correspondence between ethnicity and ecology. Historically, in Madagascar as elsewhere, the state has often intervened—creating

ethnic labels and distinctions that may or may not have much to do with ecology.

It is much more evident today than it was during the 1960s that there are no isolated ecosystems and that all humans participate in a world system. In the context of population increase (more than a doubling since the mid-1960s), the transnational spread of information, images, people, commerce, and organizations, and contemporary high-tech systems of transportation and communication, many of the assumptions of the old ecological anthropology need rethinking.

For example, Rappaport's "cognized model" (Rappaport 1968:237ff.; see Wolf, this issue) requires modification. In his formulation, the cognized model refers to native interpretations of the world, the set of rules and expectations, orienting principles, concepts, meanings, and values that are significant to an individual culture bearer and that account for why he or she does things. Contemporary people still have cognized models, but anthropologists must increasingly wonder where such models originate, how they are transmitted, and the extent to which they are unique and shared. Diffusion may be as important as enculturation in the contemporary creation and transmission of cognized models. This would seem to be an issue of as much concern to the new psychological anthropology (for example, cognitive anthropology) as to ecological anthropology.

The same is true of his "operational model" (Rappaport 1968:237ff.). Rappaport used the term to describe the ethnographer's abstraction from and analysis of what he or she studies: an outsider's account of behavior and its material determinants, context, and results; the trained observer's interpretation of why people do things; and the specification of the limits that determine what individual actions may be tolerated without destroying the system that sustains them. Specification of these dimensions of the operational model would seem to be as important today as it was a generation ago. The world has grown more complex and probably less comprehensible to most natives. Social scientists need new methods (see below) to study this complexity and the myriad forces, flows, and exchanges that now affect "local" people in their various immediate milieus.

The New Ecological Anthropology

The differences between the old and the new ecological anthropology involve policy and value orientation, application, analytic unit, scale, and method. The studies in the old ecological anthropology pointed out that natives did a reasonable job of managing their resources and preserving their ecosystems (albeit through some rather unsavory means, including mortal combat and female infanticide); but those studies, relying on the norm of cultural relativism, generally aimed at being value-neutral. By contrast,

the new ecological, or environmental, anthropology blends theory and analysis with political awareness and policy concerns. Accordingly, new subfields have emerged, such as applied ecological anthropology and political ecology (Greenberg and Park 1994).

We cannot be neutral scientists studying cognized and operational models of the environment and the role of humans in regulating its use when local communities and ecosystems are increasingly endangered by external agents. Many anthropologists have witnessed personally a threat to the people they study—commercial logging, environmental pollution, radioactivity, environmental racism and classism, ecocide, and the imposition of culturally insensitive external management systems on local ecosystems that the native inhabitants have managed adequately for centuries. Today's world is full of neocolonial actions and attitudes; outsiders claim or seize control over local ecosystems, taking actions that long-term residents may disdain. Concerned with proposing and evaluating policy, the new environmental anthropology attempts not only to understand but also to devise culturally informed and appropriate solutions to such problems and issues as environmental degradation, environmental racism, and the role of the media, NGOs, and various kinds of hazards in triggering ecological awareness, action, and sustainability.

Environmental anthropologists focus on new units of analysis—national and international, in addition to the local and regional, as these levels vary and link in time and space. Entering into a dialogue with schools of natural resources and the environment, anthropology's comparative perspective adds an international dimension to the understanding of issues like environmental justice and ecosystems management, which natural resource specialists have been studying for decades, though mainly with a U.S. focus. Conversely, anthropologists use methods and perspectives developed in other nations and cultures to shed light on environmental issues in the United States and Canada as North America itself becomes an increasingly common field of study in anthropology. And new methods—from surveys to satellite imagery—are used to place ecological issues in a context far larger, deeper, and broader in space and time than the bounded-system approach of the 1960s. Methodologies within the new ecological anthropology must be appropriate to the complex linkages and levels that structure the modern world.

The changes in ecological anthropology mirror more general changes in anthropology: the shift from research focusing on a single community or "culture," perceived as more or less isolated and unique, to recognizing pervasive linkages and concomitant flows of people, technology, images, and information, and to acknowledging the impact of differential power and status in the postmodern world on local entities. In the new ecological anthropology, everything is on a larger scale. The focus is no longer mainly the local ecosystem. The "outsiders" who impinge on local

and regional ecosystems become key players in the analysis, as contact with external agents and agencies (for example, migrants, refugees, warriors, tourists, developers) has become commonplace. Ecological anthropologists must pay attention to the external organizations and forces (for example, governments, NGOs, businesses) now laying claim to local and regional ecosystems throughout the world. Even in remote places, ecosystem management now involves multiple levels. For example, among the Antankarana of northern Madagascar (Gezon 1997), several levels of authority claim the right to use and regulate natural resources and local ecosystems. Actual or would-be regulators there include local communities, traditional leaders (the king, chief, or *mpanjaka*), provincial and national governments, and WWF (the World Wide Fund for Nature), which is partly funded by USAID.

Issues for the New Ecological Anthropology

One firm conclusion of the old ecological anthropology in all its guises (for example, the "ecological anthropology" of Rappaport and Vayda, the "cultural materialism" of Harris, and the "ethnoscience" of Berlin, Conklin, Frake, and Goodenough) was that indigenous groups have traditional ways of categorizing resources, regulating their use, and preserving the environment. An *ethnoecology* is any society's traditional set of environmental perceptions—that is, its cultural model of the environment and its relation to people and society. Today's world features a degree of political and economic interconnectedness unparalleled in global history. Local ethnoecologies are being challenged, transformed, and replaced. Migration, media, and industry spread people, institutions, values, and technologies. Imported values and practices often conflict with those of natives. In the context of population growth, migration, commercial expansion, and national and international incentives to degrade the environment, ethnoecological systems that have preserved local and regional environments for centuries are increasingly ineffective.

Ethnoecological Clashes: Developmentalism and Environmentalism

Challenging traditional ethnoecologies are two, originally Euro-American, ethnoecologies: developmentalism and environmentalism (Kottak and Costa 1993). These models enter myriad cultural settings, each of which has been shaped by particular national, regional, and local forces. Because different host communities have different histories and traditions, the impact of external forces is not universal or unidirectional. The spread of either developmentalism or environmentalism is always influenced by national, regional, and local ethnoecologies and their powers of adaptation and resistance.

Environmentalism entails a political and social concern with the depletion of natural resources (Bramwell 1989:3–6; Douglas and Wildavsky 1982:10–16). This concern has arisen with, and in opposition to, the expansion of a cultural model (developmentalism) shaped by the ideals of industrialism, progress, and (over)consumption (Barbour 1973; Pepper 1984). Environmental awareness is rising today as local groups adapt to new circumstances and to the models of developmentalism and environmentalism. Hazards created by development have been necessary conditions for the emergence of new perceptions of the environment. Environmental safeguards and conservation of scarce resources are important goals—from global, national, long-run, and even local perspectives. Still, ameliorative strategies must be implemented in the short run and in local communities. If traditional resources and products are to be destroyed, removed, or placed off limits (whether for development or conservation), they need to be replaced with culturally appropriate and satisfactory alternatives.

A new, possibly mediating, ethnoecological model—*sustainable development*—has emerged from recent encounters between local ethnoecologies and imported ethnoecologies, responding to changing circumstances. Sustainable development aims at culturally appropriate, ecologically sensitive, self-regenerating change. It thus mediates between the three models just discussed: traditional local ethnoecology, environmentalism, and developmentalism. "Sustainability" has become a mantra in the discourse surrounding the planning of conservation and development projects, but clear cases of successful sustainable development are few.

Issues addressed by the new ecological anthropology arise at the intersection of global, national, regional, and local systems, in a world characterized not only by clashing cultural models but also by failed states, regional wars, and increasing lawlessness. Local people, their landscapes, their ideas, their values, and their traditional management systems are being attacked from all sides. Outsiders attempt to remake native landscapes and cultures in their own image. The aim of many agricultural development projects, for example, seems to be to make the world as much like Iowa as possible, complete with mechanized farming and nuclear family ownership—despite the fact that these models may be inappropriate in settings outside the midwestern United States. Development projects often fail when they try to replace native forms with culturally alien property concepts and productive units (Kottak 1990). Also problematic is the modern intervention philosophy that seeks to impose global ecological morality without due attention to cultural variation and autonomy. Countries and cultures may resist interventionist philosophies aimed at either development or globally oriented environmentalism.

A clash of cultures related to environmental change may occur when development threatens indigenous peoples and

their environments. Native groups like the Kayapó of Brazil may be threatened by regional, national, and international development plans (such as a dam or commercially driven deforestation) that would destroy their homelands. A second clash of cultures related to environmental change occurs when external regulation threatens indigenous peoples. Thus, native groups, such as the Tanosy of southeastern Madagascar, may be harmed by regional, national, and international environmental plans that seek to *save* their homelands. Sometimes outsiders expect local people to give up many of their customary economic and cultural activities without clear substitutes, alternatives, or incentives. A traditional approach to conservation has been to restrict access to protected areas, hire park guards, and punish violators.

Problems usually arise when external regulation replaces the native system. Like development projects, conservation schemes may ask people to change the way they have been doing things for generations to satisfy planners' goals rather than local goals. In locales as different as Madagascar, Brazil, and the Pacific Northwest of North America, people are being asked, told, or forced to change or abandon basic economic activities because to do so is good for "nature" or "the globe." Environmentalists from northern nations increasingly preach ecological morality to the rest of the world—raising issues of national and local autonomy. "Good for the globe" doesn't play very well in Brazil, where the Amazon is a focus of environmentalist attention. Brazilians complain that Northerners talk about global needs and saving the Amazon only after they destroyed their own forests for First World economic growth. Akbar Ahmed (1992) finds the non-Western world to be cynical about Western ecological morality, seeing it as yet another imperialist message. "The Chinese have cause to snigger at the Western suggestion that they forgo the convenience of the fridge to save the ozone layer" (Ahmed 1992:120). Well-meaning conservation efforts can be as insensitive as development schemes that promote radical changes without involving local people in planning and carrying out the policies that affect them. When people are asked to give up the basis of their livelihood, they usually resist.

Consider the case of a Tanosy man living on the edge of the Andohahela reserve of southeastern Madagascar. For years he has relied on rice fields and grazing land inside the reserve. Now external agencies are telling him to abandon this land for the sake of conservation. This man is a wealthy *ombiasa* (traditional sorcerer-healer). With four wives, a dozen children, and twenty head of cattle, he is an ambitious, hard-working, and productive peasant. With money, social support, and supernatural authority, he is mounting effective resistance against the park ranger who has been trying to get him to abandon his fields. The ombiasa claims he has already relinquished some of his fields, but he is waiting for compensatory land. His most effective

resistance has been supernatural. The death of the ranger's young son was attributed to the ombiasa's magical power. After that the ranger was less vigilant in his enforcement efforts.

Biodiversity Conservation

Biodiversity conservation has become an issue in political ecology, one of the subfields of the new ecological anthropology. Such conservation schemes may expose very different notions about the "rights" and value of plants and animals versus those of humans. In Madagascar, many intellectuals and officials are bothered that foreigners seem more concerned about lemurs and other endangered species than about Madagascar's people. As one colleague there remarked, "The next time you come to Madagascar, there'll be no more Malagasy. All the people will have starved to death, and a lemur will have to meet you at the airport." Most Malagasy perceive human poverty as a more pressing problem than animal and plant survival.

On the other hand, accepting the idea that preserving global biodiversity is a worthwhile goal, one vexing role for applied ecological anthropology is to devise socially sensitive and culturally appropriate strategies for achieving biodiversity conservation—in the face of unrelenting population growth and commercial expansion. How does one get local people to support biodiversity conservation measures that may, in the short run at least, diminish their access to strategic and socially valued resources?

I am one of several anthropologists who have done social-soundness analysis for conservation and development projects. Such projects aim, in theory at least, at preserving natural resources and biodiversity while promoting human welfare through "development." My experience designing the social-soundness component of the SAVEM project (Sustainable and Viable Environmental Management), intended to preserve biodiversity in Madagascar, suggested that a gradual, sensitive, and site-specific strategy is most likely to succeed (Kottak 1990; Kottak and Costa 1993). Conservation policy can benefit from use of a flexible "learning process" model rather than a rigid "blueprint" strategy (Korten 1980; see also Kottak 1990). The approach I recommended for Madagascar involves listening to the affected people throughout the whole process in order to minimize damage to them. Local people (with at least some secondary education) were trained as "para-anthropologists" to monitor closely the perceptions and reactions of the indigenous people during the changes.

Like development plans in general, the most effective conservation strategies pay attention to the needs and wishes of the people living in the target area. Conservation depends on local cooperation and participation. In the Tanosy case mentioned above, the outsider guardians of the reserve needed to do more to satisfy affected people, through boundary adjustments, negotiation, and compensation. For

effective conservation (as for effective development) the task is to devise culturally appropriate strategies. Neither development agencies nor NGOs will succeed if they try to impose their goals without considering the practices, customs, rules, laws, beliefs, and values of the people to be affected.

Reasons to conserve should be explained in terms that make sense to local people. We found in Madagascar that the economic value of the forest for agriculture (as an anti-erosion mechanism and reservoir of potential irrigation water) provided a much more powerful incentive against forest degradation than did such global goals as "preserving biodiversity." Most Malagasy have no idea that lemurs and other endemic species exist only in Madagascar. Nor would such knowledge provide much of an incentive for them to conserve the forests if doing so jeopardized their livelihoods.

In the long run millions of Malagasy stand to benefit from forest conservation. This figure includes the urbanites, who depend on forested areas for water and electricity, as well as the rural people, whose rice cultivation will be hurt by increased erosion and diminishing watersheds. In 1990 and 1991 my associates and I found that some villagers in northern Madagascar already recognized the link between deforestation and a low water table. Their ecological awareness was rising slowly. Rural people were starting to realize that irrigation water gets scarcer after nearby forests are cut.

Ecological Awareness and Environmental Risk Perception

The "applied" ("engaged" in Rappaport's [1994] terms) role of today's ecological anthropologist may be as agent or advocate—planner and agent of policies aimed at environmental preservation or amelioration—or advocate for local people actually or potentially at risk through various forces and movements, including developmentalism and environmentalism. One research-and-development role for today's ecological anthropologist is to assess the extent and nature of ecological awareness and activity in various groups and to harness parts of native ethnoecological models to enhance environmental preservation and amelioration.

With Brazilian colleagues Alberto Costa and Rosane Prado, I have researched environmental risk perception and its relation to action at several sites in Brazil (Costa et al. 1995; Kottak and Costa 1993). Our assumption has been that, although people won't act to preserve the environment if they perceive no threats to it, risk perception does not guarantee action. Our research sought answers to several questions: How aware are people of environmental hazards? How do, can, and will they respond to them? Why do some people ignore evident hazards while other people respond to minor dangers with strong fears? How is

risk *perception* related to *actions* that can reduce threats to the environment and to health? (For an American take on such questions, see Kempton et al. 1995.)

A key assumption underlying our Brazilian research is as follows: although the presence of an actual hazard increases risk perception, such perception does not arise inevitably through rational cost-benefit analysis of risk. Instead, risk perception emerges (or lags) in cultural, political, and economic contexts shaped by encounters among local ethnoecologies, imported ethnoecologies (often spread by the media), and changing circumstances (including population growth, migration, and industrial expansion).

Environmental awareness was especially evident in Brazil immediately before and after the Earth Summit or UNCED (the United Nations Conference on the Environment and Development), held in Rio de Janeiro in June 1992. Ecological awareness has been abetted by the media, particularly television—to which Brazil is well-exposed, with the world's most watched commercial television network, Globo. Brazilian environmentalism began to grow in the mid-1980s, reflecting the return of public debate along with democracy—*abertura*, the Brazilian *glasnost*, after two decades of military rule. Brazilian environmentalism, strongest in cities in the southcentral part of the country, is a growing political force, but with mainly urban support.

There is much less ecological awareness outside the main cities. A simple illustration comes from my own research in Arembepe (Bahia state), an Atlantic fishing town I have been studying since 1962 (Kottak 1999). Since the early 1970s, Arembepe has suffered air and water pollution from a nearby multinationally owned titanium dioxide factory. In three decades, Arembepe's municipal seat, Camaçari, has grown tenfold, from a sleepy rural town into a major industrial (petrochemical) center. Chemical pollution of the region's streams, rivers, and coastal waters now endangers wildlife and people.

Like others in their municipality, Arembepeiros face real and immediate hazards—industrial pollution of the air, fresh water, and the ocean. Several times, reporters from the nearby metropolis of Salvador have covered the chemical pollution of Arembepe's coastal water and freshwater lagoons. Most villagers have seen those reports on TV. Still, local awareness of immediate environmental threats hasn't increased as rapidly as the hazards have. Thus, walking along the beach north of Arembepe one day in 1985, I passed dead sea gulls every few yards. There were hundreds of birds in all. I watched the birds glide feebly to the beach, where they set down and soon died. I was stunned and curious, but local people paid little attention to this matter. When I asked for explanations, people said simply "the birds are sick." Neither Arembepeiros nor scientists I spoke with in Salvador (who speculated about an oil spill or mercury poisoning) could provide a definitive explanation for the dead birds. Like other contemporary

Brazilians, Arembepeiros seem to pay more attention to distant threats than to local ones.

In Brazil, nationally publicized environmental threats have included a radioactive-cesium accident at Goiânia, the degradation of the Amazon rain forest, the murder of the ecologically minded labor leader Chico Mendes, and the effects of gold extraction, highway and dam construction, and other intrusions of the world system on native peoples and their lands. The media have reported about risks posed by mercury in the rivers, industrial pollution, and poor waste disposal.

Although Brazilian environmental awareness has grown, media accounts have followed the international lead by focusing on the Amazon as *the* ecologically threatened region. Community-level data we have collected at several sites show that Amazonian deforestation is the nonlocal ecological issue most familiar to ordinary Brazilians. When they are asked about "ecology," most Brazilians mention the Amazon instead of hazards closer to home. But environmental threats with global implications (including deforestation) exist in many areas of Brazil besides the Amazon.

Although the Brazilian media have increased their environmental coverage, there is little evidence for increased ecological awareness and activity at the local level, especially among lower-class people. Such activity is more likely to be initiated by NGOs and politicians than by threatened communities. My research in Brazil and Madagascar convinces me that people won't act to preserve the environment (regardless of what environmentalists and policymakers tell them to do) if they perceive no threat to it. They must also have some good reason (for example, preserving irrigation water or a tax incentive) for taking action to reduce the environmental threat. They also need the means and the power to do so. Risk perception per se does not guarantee environmental organization and action.

NGOs and Rights Movements

The worldwide proliferation of nongovernmental organizations is a major trend in late-twentieth-century political organization. This proliferation merits the attention of the new ecological anthropology because so many NGOs have arisen around environmental and "rights" issues. Over the past decade, the allocation of international aid for "development" (including conservation as well as development) has systematically increased the share of funds awarded to NGOs, which have gained prominence as social change enablers.

In the "development community" (for example, the World Bank, USAID, UNDP [United Nations Development Programme]), it is widely assumed that a strategy of channeling funds to NGOs, PVOs (private voluntary organizations), and GROs (grass roots organizations) will maximize immediate benefits to community residents.

NGOs are generally viewed as more responsive to local wishes and more effective in encouraging community participation than are authoritarian and totalitarian governments. However, this strategy is being increasingly criticized, especially in cases (for example, Madagascar) in which powerful, expatriate-staffed international NGOs are allowed to encroach on the regulatory authority of existing governments. There is a real issue of neocolonialism when it is assumed that NGOs with headquarters in Europe or North America are better representatives of the people than are their own elected governments, although certainly they may be.

The emergence and international spread of "rights" movements (human, cultural, animal) is also of interest to ecological anthropology. The idea of human rights challenges the nation-state by invoking a realm of justice and morality beyond and superior to particular countries, cultures, and religions. Human rights are seen as inalienable (nation-states cannot abridge or terminate them) and metacultural (larger than and superior to individual nation-states). Cultural rights, on the other hand, apply to units *within* the state. Cultural rights are vested not in individuals but in identifiable groups, such as religious and ethnic minorities and indigenous societies. Cultural rights include a group's ability to preserve its culture, to raise its children in the ways of its forebears, to continue its language, and not to be deprived of its economic base (Greaves 1995:3). Greaves (1995) points out that because cultural rights are mainly uncodified, their realization must rely on the same mechanisms that create them—pressure, publicity, and politics. Such rights have been pushed by a wave of political assertiveness throughout the world, in which the media and NGOs have played a prominent part.

The notion of indigenous intellectual property rights (IPR) has arisen in an attempt to conserve each society's cultural base—its core beliefs and principles, including its ethnoecology. IPR is claimed as a group right—a cultural right, allowing indigenous groups to control who may know and use their collective knowledge and its applications. Much traditional cultural knowledge has commercial value. Examples include ethnomedicine (traditional medical knowledge and techniques), cosmetics, cultivated plants, foods, folklore, arts, crafts, songs, dances, costumes, and rituals. According to the IPR concept, a particular group may determine how indigenous knowledge and its products may be used and distributed and the level of compensation required.

Environmental Racism

The issues of interest to the new ecological anthropology are myriad, but a final one may be mentioned: environmental racism. This is a form of institutional discrimination in which programs, policies, and institutional arrangements deny equal rights and opportunities to, or

differentially harm, members of particular groups. Bunyan Bryant and Paul Mohai define environmental racism as "the systematic use of institutionally-based power by whites to formulate policy decisions that will lead to the disproportionate burden of environmental hazards in minority communities" (1991:4). Thus, toxic waste dumps tend to be located in areas with nonwhite populations.

Environmental racism is discriminatory but not always intentional. Sometimes toxic wastes *are* deliberately dumped in areas the residents of which are considered unlikely to protest (because they are poor, powerless, "disorganized," or "uneducated"). (This is why a polluting titanium dioxide factory was placed near my Brazilian field site of Arembepe rather than in an area having more political clout [see Kottak 1999].) In other cases property values fall after toxic waste sites are located in an area. The wealthier people move out, and poorer people, often minorities, move in, to suffer the consequences of living in a hazardous environment.

Methodology in the New Ecological Anthropology

The new ecological anthropology can draw on a series of high-tech research methods. Satellite imagery (deployed synchronically or diachronically) has been used to locate ecological hotspots (e.g., areas of deforestation or pollution), which have then been investigated on the ground by multidisciplinary teams (See Green and Sussman 1990; Kottak et al. 1994; Sussman et al. 1994). GIS (geographical information systems) and other approaches may be used to map various kinds of data on human and environmental features (See Sponsel et al. 1994). Macroscope software, developed by J. Stephen Lansing and others, facilitates the mapping—on a computer screen—of various kinds of information, such as yields in Balinese fields in relation to pest damage and farming practices. Survey data can be collected across space and time and compared. However, the availability of such high-tech methods should not seduce us away from anthropology's characteristic focus on people. Ethnographic research in varied locales helps us discover relevant questions, which some of the techniques just mentioned can help us answer. The new ecological anthropology can use high-tech methods, while taking care not to let electronic dazzle divert attention from direct, firsthand ethnographic study of people and their lives.

Also relevant to the new ecological anthropology is linkages methodology, as elaborated by Kottak and Colson (1994). As Elizabeth Colson and I have pointed out, anthropologists are increasingly developing models of their subject matter that are isomorphic with the structure of the modern world, including the various regional, national, and international linkages within it. We use the term *linkages methodology* to describe various recent multilevel, multisite, multitime research projects. A definition of link-

ages in relation to research methodology and content was the goal of a working group of anthropologists who first met in 1986.[1] All of us were concerned with the impact of international and national forces, including development projects, on our research locales. Most members of the Linkages Group (as we called ourselves) had worked more than once in the same region. We knew the advantages of observing how people respond to different opportunities and perturbations at various stages of their lives.

We recognized the value of research samples (both communities and mobile individuals) that could be followed through time. What kinds of links did they have with others, including external agencies? This line of inquiry entailed a census approach, a network approach (to trace relationships associated with geographical mobility and external interventions), plus survey and ethnographic techniques. The linkages approach to change also required attention to the roles of governmental and nongovernmental organizations, and of changes in marketing, transportation, and communication systems.

One method of linkages research is to study a site or sites over time. Another is systematic intercommunity comparison, requiring multiple sites that are chosen because they vary with respect to key criteria. These sites can be drawn from the same region, and the data collected would be part of the same study. They can also be from different regions (even different countries), if anthropologists can provide minimum core data (Epstein 1978:220) to make comparison possible. Linkages research extends to the levels at which policies are worked out, examining archives and official records and interviewing planners, administrators, and others who impinge on the study population(s). The aim of linkages methodology is to link changes at the local level to those in regional, national, and world systems.

Linkages research is planned as an ongoing process requiring teamwork. Time and personnel are needed to follow a dispersing population, to study different sites, to interview at many levels, to explore archives and records, and to do follow-up studies. Involvement of host country colleagues, including local assistants and other community residents, is a key to continuity. Thus, *linkages* also refers to cooperation by people with common research interests in the effort to generate a fund of data.

One example of linkages methodology is the research I directed in Brazil on industrialization and commercial expansion, focusing on environmental hazards and risk perception. The investigation proceeded at two levels: (1) national—Brazil as a whole, where the government introduced a policy of industrialization in the early 1950s, and (2) local—across a range of sites differently exposed to risks (Costa et al. 1995; Kottak and Costa 1993). The field research design was systematic intercommunity comparison (based on quantitative and qualitative data). This methodology adds an analytic level to traditional "risk analysis,"

which studies populations *directly exposed* to environmental hazards like nuclear repositories. Given *that* research design, public reactions to a threat are inevitably interpreted within a stimulus-response framework (a threat causes certain responses). By contrast, our design assumed that variation in environmental awareness and risk perception could be most accurately understood by studying a range of sites differentially exposed to hazards. Comparison is essential. Any approach limited to endangered groups can't help but see risk perception mainly in response to an immediate stimulus. (For other linkages projects, see Kottak and Colson 1994.)

The linkages approach (summarized in Table 1) accords with anthropology's traditional interest in cultural change. Its roots can be traced to earlier work, including Julian Steward's large-scale evolutionary and comparative projects (Steward 1950, 1955, 1956), the research of Max Gluckman and others who did "extended-case analysis," and world system approaches that emphasize the embeddedness of local cultures in larger systems (Comaroff 1982; Mintz 1985; Nash 1981; Roseberry 1988; Schneider 1977; Wallerstein 1974; Wolf 1982).

The linkages approach agrees with world system theory that much of what goes on in the world today is beyond anthropology's established conceptual and methodological tools. Traditional ethnography, based on village interviews and participant-observation, assumed that informants knew what was going on in that delimited space. Today, however, no set of informants can supply all the information we seek. Local people may not be helpless victims of the world system, but they cannot fully understand all the relationships and processes affecting them.

Not just the old ecological anthropology but traditional ethnography in general also propagated the illusion of isolated, independent, pristine groups. By contrast, the linkages approach emphasizes the embeddedness of communities in multiple systems of different scale. Local people take their cues not just from neighbors and kin but also from a multitude of strangers—either directly or via the media. Linkages research combines multilevel (international, national, regional, local) analysis, systematic comparison, and longitudinal study (using modern information technology). Challenging the tradition of the lone ethnographer, linkages methodology develops large-scale, explicitly comparative *team projects* (ideally involving international research collaboration). Ideally research is organized so that as new forces impinge on the study region, they can be examined in terms of their differential effects on known research populations. Dealing with social transformation, the linkages perspective considers both the exogenous pressures toward change and the internal dynamic of local cultures. Unlike the old ecological anthropology (and traditional sociocultural anthropology in general), linkages projects study process, engage with history, consider the role of political and economic power, and systematically

Table 1. Linkages methodology summarized.

- longitudinal
- systematic intercommunity comparison
- multiple sample populations
  from same region
  from different regions
  from different countries
- research extends to levels at which policies are developed
- interview planners, administrators, others who impinge on the study population(s)
- examine archives and official records
- research planned as ongoing process
- requiring team work
- key to continuity—involvement of
  host country colleagues
  local assistants
  other community residents

consider feedback among local, regional, and national institutions. However, linkages methodology still requires a basis in fieldwork.

Putting People, and Anthropology, First

While recognizing that local and regional systems are permeable and that contact and power relations are key features of ecological adaptation, the new ecological anthropology must be careful not to remove local people and their specific social and cultural forms from the analytic framework. We must pay attention to the specifics of local culture and social structure—even though people in many settings face common problems caused by world system expansion. To illustrate the importance of local specificity and of using a distinctively anthropological perspective, I will return to the social-soundness analysis I did and recommendations I made for the USAID SAVEM project aimed at biodiversity conservation in five areas of Madagascar. (The Tanosy case described above was drawn from this analysis.) To maximize the likelihood of success, the project's social design for change was founded in the traditional social forms of each target area.

The large island of Madagascar features substantial ecological and cultural diversity, such that the size and characteristics of affected groups varied with type of human ecological adaptation, from region to region and even within the reserves and other protected areas. The project had a site-specific design, recognizing that affected groups existed at various levels and in different regions. Members of the project design team visited five protected areas: the Amber Mountain complex, Beza Mahafaly, Ranomafana, Andringitra, and Andohahela. The social characteristics of each area were charted for incorporation in project design. To exemplify, I will describe the different kinds of social groups identified to be involved in the project for the four

protected areas I actually visited: Ranomafana in the Tanala homeland, Andringitra in Betsileo country, Andohahela in Tanosy-Tandroy territory, and Amber Mountain in Tankarana country.

Ranomafana

Ranomafana National Park is a protected area within the Tanala homeland. The Tanala are not a populous and thriving ethnic group, and this has become a transitional zone with considerable ethnic diversity. Descendants of nineteenth-century conquering armies from Imerina still live in the area, along with more recent Merina migrants, including merchants and slave descendants from Antananarivo (the national capital). The Betsileo, whose homeland lies just west, in the southcentral highlands, have also been expanding and migrating to the Ranomafana area, along with Tambahoaka migrants from the southeast coast.

Social issues are problematic at Ranomafana because of ethnic diversity, continuing immigration, land poverty, and stratification patterns. Most of the immigrants have come as land-poor people—slave-descended or free. Villages near the road are socially fragmentary and disorganized, with ethnic diversity, multiple unrelated families, and a higher than usual (for Madagascar) percentage (one third) of female-headed households. Some villages more distant from the road are more ethnically homogeneous, offering more cohesive structures and organizations of potential use in implementing the project—that is, in gaining local support, raising environmental awareness, and channeling benefits.

Given the extent of poverty, stratification, ethnic diversity, and social fragmentation around Ranomafana, project implementation needed to be especially sensitive. The potential for noncompliance and resistance was great. Tanala and other horticulturalists would be hurt by a prohibition on using the forest for slash-and-burn cultivation. Land-poor people who used the forest to hunt and gather for subsistence and sale would also be harmed. And those who relied on the forest to graze their cattle and hide them from rustlers would suffer, too. Most likely to benefit were people with clear land claims whose fields might be improved by small dams, better irrigation, and other agricultural inputs—the "development" part of the Conservation and Development project.

Andringitra

The Andringitra mountain area is a long-established reserve in the extreme south of the Betsileo homeland. The ethnic diversity around Andringitra is of a different and less problematic sort than that at Ranomafana. Two ethnic groups (Betsileo and Bara) have villages near Andringitra. However, each village tends to be ethnically homogeneous. Nor are issues of stratification and land poverty as troubling as in Ranomafana.

Surrounding Andringitra were at least 13 *fokontany* (village clusters), having about 10,000 total inhabitants. Each fokontany included smaller villages and hamlets, although there was a tendency toward settlement centralization in the area because of the fear of cattle rustlers, who were said to use the forests to hide and dismember the cattle they steal. (Peasants are also said to use the forests to hide their cattle from rustlers.) Around Andringitra the Betsileo villages lie to the north, and the Bara villages lie to the south.

I knew the traditional social organization and economy of the Betsileo villages around Andringitra from my previous research in the 1960s. This is a relatively recently settled (nineteenth-century) addition to the Betsileo homeland. The local economy combines irrigated rice cultivation with cattle pastoralism. Agriculture is less diversified here—focused more exclusively on rice than in the eastern, central, and northern parts of Betsileo territory. The typical Betsileo village near Andringitra contained branches of several (3 to 5) different clans. The village founders in this sparsely populated and land-rich area were small family migrants from more densely populated Betsileo areas. They came in search of land for their herds and rice cultivation. After the French conquered Madagascar they were joined by freed slaves from Betsileo country and Imerina. All now consider themselves Betsileo but maintain their different clan (*foko*) affiliations and names.

It was likely that project implementation would be easier around Andringitra than in Ranomafana. Both Betsileo and Bara have solitary descent groups, some arranged in larger associations (phratries). Ties of marriage and blood siblinghood linked people in different villages and ethnic groups. Because irrigation was traditional and widespread, inputs would be appreciated. There was room for agricultural diversification. Agricultural outreach seemed appropriate for this area. Descent group lines could also be used to enlist support and channel benefits among the Bara around Andringitra.

Andohahela

Andohahela is located near Fort Dauphin on the southeast coast. Most of the reserve lies in the traditional homeland (Anosy) of the Tanosy people. The reserve has two main ethnic groups: Tanosy (the numerically predominant group) in the east and Tandroy in the west. The mammoth eastern part of the reserve—by far the largest at 63,100 ha.—is separated from the western part (12,240 ha.) by nonreserve lands where the Tanosy farm productive irrigated rice fields. These fields rely on the Andohahela forests for their water supply. Unlike Androy (Tandroy land) and the rest of the southeast coast, Anosy is not an area of strong emigration. Despite some deforestation near Fort Dauphin, population pressure on available resources was less obvious here than at Ranomafana or Amber Mountain (see below).

The traditional Tanosy economy is diverse, with both swiddens and irrigated rice fields. Roots and tubers (sweet potato, taro, manioc) are also cultivated. Cattle is another focus of the traditional Tanosy economy and a matter of great cultural interest, as it is among the Tandroy and southern and western Malagasy generally.

In implementing this project (or any other community-level project in Madagascar), project personnel must understand the contrast between formal and informal structures—between structures and offices of the state and those of traditional social organization. The latter will often be more useful than the former for project goals. Thus, the fokontany (village cluster) president, a government office found throughout Madagascar, is an elected official and administrator. His or (rarely) her authority varies, however, from place to place. Traditional authority figures are often more important that the fokontany president. In those fokontany where one cohesive group predominates, the person chosen to stand for election (and the sure winner) is someone with little real authority. He is a stooge for the real powers—the descent group elders. He is expected to be their agent, errand boy, and foil in encounters with the state.

Both Tanosy and Tandroy retain powerful descent groups. Identification of descent group heads is vital in implementing this project in Andohahela. Descent group heads must give the project their blessing—thus maximizing the cooperation of the entire group. Descent group structure can be used to channel benefits and spread information. All the ethnic groups abutting on Andohahela have these kind of structures and leaders. The National Forestry Department has used them to distribute seedlings and gain cooperation with its tree planting programs.

Amber Mountain

The area around Diego Suarez in northern Madagascar is the traditional homeland of the Tankarana (Antankarana). Like the Tanosy near Andohahela and the Tanala near Ranomafana, the Tankarana have not expanded. The area is one of immigration rather than emigration. Indeed, the Tankarana seem to have retracted to their mountain homeland at Ankarana, where their prince *(mpanjaka)* still lives, holds court, and heads ceremonies at his capital, Ambilobe. In a country such as Madagascar, where many foreigners have been deceived by the claims of false princes, this is a real and effective prince. The project must pay attention to him, his assistants, their customs, and their ceremonies in implementing the project. Fortunately the Amber Mountain WWF staff took care (initially at least) to implement the project in ways that are culturally appropriate.

All areas of Madagascar have traditional owners, called *tompotany*—masters of the land. The Tankarana are the tompotany for the Diego Suarez area. Also important are the Anjoatsy (a mobile, seagoing group of spiritual-ritual specialists, with traditional ties to an informal version of Islam and ports on the east coast). The Anjoatsy have spiritual authority at Ambohitra (Amber Mountain proper). The WWF staff arranged for an Anjoatsy *mpijoro* (priest) to bless the park in a traditional ceremony. Similarly, at Ankarana, WWF enlisted the aid of the prince and the power of traditional Ankarana ritual to enhance cooperation with project agents.

There are immigrants throughout the Amber Mountain complex area. They include Merina (still hated in the area because of their nineteenth-century conquest of the Tankarana), Betsileo (including woodcutters working for a commercial firm that posed a threat to the forest), people from the southeast coast (Taimoro, Taisaka, Zafisoro, et al.). There are also Sakalava (from the west and northern coast), Tsimihety (from further south), and Comorians. For generations this has been an area of coastal trade (extending to the Comoros and the East African coast), interethnic contacts, and mixture. The town of Joffreville is a microcosm of the ethnic diversity that exists in this region. Although it lacked descent groups, we did identify some ethnic, religious, and school associations that might be used in project implementation, and people still heeded the ancestral ritual authority of the tompotany and their priests.

Such site-specific analysis and recommendations for a conservation-and-development project illustrate that analysis of social forms should not be subordinated to approaches that emphasize the environment at the expense of society and culture, and ecology over anthropology. People must come first. Cultural anthropologists need to remember the primacy of society and culture in their analysis and not be dazzled by ecological data. Funding sources that give priority to the hard sciences, fund expensive equipment, and support sophisticated technology should not lead us away from a focus on cultural specificity and social and cultural variables. Ecological anthropologists must put anthropology ahead of ecology. Anthropology's contribution is to place people ahead of plants, animals, and soil.

In Conclusion—Romer's Rule

The paleontologist A. S. Romer (1960) developed the rule that now bears his name to explain the evolution of land-dwelling vertebrates from fish. The ancestors of land animals lived in pools of water that dried up seasonally. Fins evolved into legs to enable those animals to get back to water when particular pools dried up. Thus, an innovation (legs) that later proved essential to land life originated to maintain life in the water. Romer's lesson—important for both the old and the new ecological anthropology—is that an innovation that evolves to *maintain* a system can play a major role in *changing* that system. Evolution occurs in increments. Systems take a series of small steps to maintain themselves, and they gradually change. Rappaport

recognized Romer's lesson in his definition of adaptation: "the processes by which organisms or groups of organisms maintain *homeostasis* in and among themselves in the face of both short-term environmental fluctuations and long-term changes in the composition and structure of their environments" (Rappaport 1971b:23-24, emphasis added).

Romer's rule can be applied to development, which, after all, is a process of (planned) socioeconomic evolution. Applying Romer's rule to development, and here especially to ecologically oriented initiatives, we would expect people to resist projects that require major changes in their daily lives, especially ones that interfere with subsistence pursuits. People usually want to change just enough to keep what they have. Motives for modifying behavior come from the traditional culture and the small concerns of ordinary life. Peasants' values are not such abstract ones as "learning a better way," "increasing technical know-how," "conserving biodiversity," or "making the world safe for democracy." (Those phrases exemplify intervention philosophy.) Instead, their objectives are down-to-earth and specific ones. People want to improve yields in a rice field, amass resources for a ceremony, get a child through school, or be able to pay taxes. The goals and values of subsistence producers may at times differ from those of people who produce for cash, just as they differ from the intervention philosophy of development planners. Different value systems must be considered during planning.

This is one more way of saying that (ecological) anthropologists should not forget culture and people as they grapple with complexity, comparison, and change. Change always proceeds in the face of prior structures (a given sociocultural heritage). The direction and nature of change is always affected by the organizational material (sociocultural patterns) at hand when the change begins. Thus, cultural ways cannot be regarded as blank checks on which the environment, or history, can freely and mechanically write.

Notes

1. This perspective was formalized at two Wenner-Gren supported conferences organized by Douglas White and held in La Jolla, California, in 1986. Participants, who became founding members of Linkages: The World Development Research Council, included Lilyan Brudner-White, Michael Burton, Elizabeth Colson, Scarlett Epstein, Nancie Gonzalez, David Gregory, Conrad Kottak, Thayer Scudder, and Douglas White.

Linkages' goals include assisting in organizing and coordinating basic scientific research on development on a worldwide basis. This includes formulation of theory, testing of hypotheses, development of appropriate databanks for testing theoretical formulations, monitoring change, establishing trends, and identifying specific linkages or mechanisms involved in social change, including development interventions.

A crucial vehicle for development research, including study of both spontaneous and planned social change, is the systematic integration of data from longitudinal field sites. Such sites allow analysis and evaluation of long-term trends and effects, including cyclical changes relating to human populations and their ecologies, including the ecology of world systems and networks.

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ENVIRONMENTS AND ENVIRONMENTALISMS IN ANTHROPOLOGICAL RESEARCH: Facing a New Millennium

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■ **Abstract**   With the concept of environment as its organizing motif, this review focuses on two general fields of anthropological environmental research: ecological anthropology and the anthropology of environmentalism. Analysis of the complementary political and human ecology research programs is structured around four theoretical and methodological areas: transformations in the ecological paradigm, levels of analysis and articulation, the use of history, and the reemergence of space. Ethnographic analyses of the social forces of environmentalism point to civil society as an emerging and important protagonist with regard to environmental issues, and these social forces are reviewed within the categories of environmental movements, rights, territories, and discourses. A final prospective section looks at contemporary urban, viral, virtual, and warfare environments and postulates that the combination of empirical and political approaches can provide for anthropology an expanded role, one that has strong bioethical implications, in environmental debates and issues.

CONTENTS

INTRODUCTION

For the past two decades, anthropological research on environmental issues has been part of a broad public sphere that has witnessed a sharp increase in environmental concerns and activism throughout the world. That has, in turn, been accompanied by significant interrelational changes between humans and their environment, resulting from the use of new communication and biological technologies. Given the breadth and complexity of environmental issues, academic disciplinary boundaries are easily crossed and new sites of transdisciplinary research have emerged that combine natural and social-scientific approaches in unique ways. Anthropology, however, has specific contributions to make to the wider environmental research field.

In common usage, the term environment is often used as a synonym for nature (i.e. the biophysical or nonhuman environment), but this usage creates great conceptual confusion because the environment of a particular human group includes both cultural and biophysical elements (Rappaport 1979). By extension, the organism/environment dynamic, which is relational (Levins & Lewontin 1985) and perspectivist (Viveiros de Castro 1996), is often erroneously fused with the nature/culture dualism, which is essentialist and substantive. The concept of environment as a research tool allows for the delimitation of a wide range of socionatural units of analysis (Smith & Reeves 1989) that transect the nature/culture division orthogonally.

In this context, the term environmentalism refers to an explicit, active concern with the relationship between human groups and their respective environments. Although "environmentalist" usually refers to political activists, the term can reasonably include persons and groups that are directly involved with understanding and/or mediating this relationship. Thus, anthropologists and other social scientists who are involved in environmental research can be considered as representing the environmental wing of their respective disciplines.

Current environmental research in anthropology falls into two major areas that have distinct methodologies and objects of study. The first, called ecological anthropology, uses ecological methodologies to study the interrelations between human groups and their environment. The second, called the anthropology of environmentalism, uses ethnographic methodologies to study environmentalism as a type of human action. These two areas provide the organizing motif for this review. It concludes with a prospective look at new environments and their corresponding new environmentalisms that are gaining importance in the world.

This review is indicative, rather than exhaustive, in that it analyzes representative or insightful works that exemplify significant new trends or areas of interest in anthropological environmental research. Special attention is given to work that concerns the tropical rainforests (particularly the Amazon) because of the importance these biomes have to planetary environmental issues. Publications with important transdisciplinary dialogue and debate by practitioners in particular fields of study are referred to throughout the review.

ECOLOGICAL ANTHROPOLOGY

Political and Human Ecology

Nearly two decades ago, Orlove (1980) provided a critical review of the literature on ecological anthropology in which he noted the advance of "processual ecological anthropology" as a stage that was gradually supplanting neofunctionalist approaches. One influential current within processual ecology is "human systems ecology," initially developed by Bennett (1976), whose long-term work with agricultural systems led him to the notion of "human ecology as human behavior," whereby cultural elements are translated into active behavioral tendencies involving "responses and adaptations made by real people in real-life contexts" (Bennett 1993:45–46).

During the 1980s, actor-based, decision-making models used in processual ecology were combined with political economy approaches used in anthropology (see Roseberry 1988), which led to the emergence and consolidation of a significant research program, newly termed political ecology. An early theoretical outline of political ecology (see Schmink & Wood 1987) was applied to the southern Pará region of the Brazilian Amazon, where a host of "contested frontiers" were uncovered involving disputes between multiple social actors over their definitions of, access to, and control over natural resources (Schmink & Wood 1992). In an ethnographic analysis of the local struggles between farmers and ranchers over land and water in a peasant corporate community in northwestern Mexico, Sheridan (1988) develops a political ecology analysis that places these struggles within the context of intervention by regional economic interests, seasonal water shortages, and the mediation of government bureaucrats at local, regional, and national levels.

One study (Stonich 1993) places the agency of rural peasants at the forefront of environmental destruction in southern Honduras based on their "strategies for survival" and, at the same time, it reveals the larger developmentalist context within which these strategies and degradation occur. In 1994, the *Journal of Political Ecology* was launched at the University of Arizona with the goal of contributing "critically and substantively to an increased understanding of the interaction between political and environmental variables broadly conceived" (Greenberg & Park 1994:8). In just a decade, the political ecology research program in anthropology developed a high level of empirical (DeWalt 1998) and political (Hvalkof & Escobar 1998) sophistication.

Geographers were also developing a research program in political ecology during this time (for an early and influential theoretical statement see Blaikie & Brookfield 1987). Furthermore, geographers elaborated a political ecology, which they termed liberation ecology, that incorporates contemporary poststructural theory on discourse and meaning (see for example Peet & Watts 1996). Bryant & Bailey (1997:192), however, are hesitant to take the "turn to discourse," since it "may result in a turn away from the material issues that, after all, prompted the birth of Third World political ecology in the first place."

In 1988, the University of California at Santa Cruz initiated a new publication that helped consolidate a neo-Marxian perspective to political ecology research. The journal—*Capitalism, Nature, Socialism*—subsequently entered into an international collaboration with three sister journals published in French, Italian, and Spanish. The notion of the "second contradiction of capitalism" (O'Connor 1998:158–77) is that capitalist relations of production and forces of production impair or destroy their own social and material "conditions of production." Consequently, this notion places contemporary environmental crises within the framework of the worldwide expansion of capitalism and offers an alternative reading of the emergence of the environmentalist movement as a potential social barrier to capitalist accumulation. One innovative work (Leff 1995:21) asserts that "the functional structure of ecosystems, insofar as they determine the productivity of natural resources, affects the conditions of production of value and surplus value."

Flourishing human ecology studies coincided with the consolidation of the political ecology research program and have moved in many new and fruitful directions. The interdisciplinary journal, *Human Ecology*, proved to be an important forum for a host of anthropological studies that adopted ecosystem approaches (see also Moran 1990) dealing with the specific cultural and biophysical requirements of foragers, pastoralists, and subsistence and intensive agriculturalists (Bates & Lees 1997). Another key contribution to these studies is the extensive, cross-cultural research on households—understood as both agricultural and social institutions—carried out by Netting (1993). Based on numerous empirical studies, Netting proposes theories regarding issues such as property rights, land use, population growth, food production, and sustainable agriculture. Similarly, a detailed ethnography by Sillitoe (1996) of how the Wola of Papua, New Guinea, manage and shape their wet, steep terrain is insightfully combined with essential scientific information concerning climate, soil types, land resources, and biotic factors.

Within the broader field of ecological anthropology, political and human ecology can be considered as complementary research programs that have different transdisciplinary emphases. Anthropological political ecology has established a dialogue with geography and political economy and has developed a strong critical approach in which concepts such as claims, rights, power, and conflicts predominate. Anthropological human ecology has established a dialogue with the biological sciences and has developed a strong empirical approach in which concepts such as energy flows, knowledge systems, subsistence, and adaptation pre-

dominate. The power of their complementariness lies precisely in the union of the critical with the empirical approach. In addition, the ecological methodology common to both confronts them with similar theoretical and empirical problems, which are addressed in the contexts of (*a*) paradigmatic shifts, (*b*) levels of analysis and articulation, (*c*) the use of history, and (*d*) the reemergence of space.

Transformations in the Ecological Paradigm

The nature/culture dualism has provided the baseline for the greater part of scientific thinking throughout this century and has strong, often unrecognized, methodological and epistemological implications for research, including the separation of the natural from the social sciences, both institutionally and intellectually. New ecological research is engaged in the difficult, challenging process of finding practical ways of bridging this divide, and anthropology, which has always worked on both sides of the nature/culture fence, is strategically situated to contribute to this effort. Unfortunately, the radicalization of the nature/culture dualism during the 1990s has unduly compromised this strategic position by provoking the so-called science wars, which have involved a great deal of conceptual mudslinging and which have even led to formal splits in university anthropology departments. As a result, the development of an ecological theory that incorporates natural and cultural dimensions within a single, broad paradigmatic framework is more urgent than ever. It is, in fact, being hammered out far from the battlefield of the science wars by anthropologists from many countries working with peoples and their environmental problems throughout the world.

One of the primary problems faced by ecological theorists is how to address both natural and social phenomena within a single explanatory framework. Environmental historians have been particularly sensitive to this problem. Dean (1995:9), in his history of the Brazilian Atlantic forest, treats that forest as a "natural subject"; Worster (1993:123–34) undertakes the difficult task of "thinking like a river." In fisheries research, the actions of scallops are explained as a crucial element in determining the outcome of certain research projects (Callon 1986). These works point to the notion of natural agency, in which the actions of the biophysical world must be incorporated into ecological analysis. Serres (1995) maintains that the reincorporation of natural agency is a major challenge facing contemporary philosophy, whereas Gellner (1995:252) argues that the social construction of reality "needs to be complemented by the natural construction of society."

This problem is approached via the symmetry, or equivalence, postulate developed by Barnes & Bloor (1982), which has been most fully implemented in the field of the sociology of knowledge. In a study of technological change, Law (1987:114) argues that "to treat natural and social adversaries in terms of the same analytical vocabulary" allows the researcher "to discover the pattern of forces as these are revealed in the collisions that occur between different types of elements, some social and some otherwise." Vayda & Walters (1999) maintain that ecological research should not make a priori judgments concerning the causes of environmental change but must be willing and able to assess all possible factors, whether

of biological or social origin or, as is usually the case, of the complex and contingent interaction of both. Latour (1993) has applied the notion of symmetry to anthropology as a means of bridging its two great divides, that of nature/culture and that of us/them.

In this context of epistemological symmetry, the following question arises: Which discipline is the most indicated to translate natural agency into concepts for use in analysis? Yearley (1993) explores a series of problems that arise when science is used as a "stand-in for nature." In spite of these difficulties, the natural sciences remain a prime candidate for this task because they have been studying natural agency systematically and in great detail for a long time (Murphy 1994). If one wants to understand the agency of a volcano, questioning a volcanologist is not a bad place to start, although this need not eliminate seeking out folk knowledge, and particularly information from people who live in regions of frequent volcanic activity. Knowledge of nature through artistic expression is also revealing—consider Julio Cortázar's (1964) short story of an existential encounter between a human being and an *axolotl*, or Plumwood's (1996) narration of her episode as prey for a crocodile—and can be useful in understanding natural agency. The select use of different types of knowledge can lead to a postpositivist position that retains empiricist (see Jackson 1989) and realist (see Morris 1997) foundations in which natural scientific knowledge plays a leading, but not exclusive, role in representing natural agency.

Epistemological symmetry must confront the realist condition of ontological asymmetry. The fact that all elements are operating within a single symmetrical field does not mean that they are operating according to the same principles or that the power relations between them are symmetrical. The incorporation of natural agency into ecological analysis does not require that the biophysical world be anthropomorphized. On the contrary, recognizing and incorporating the distinctive type, structure, and power of natural agency is one of the key methodological challenges of ecological analysis. Biological and geological processes cannot be subsumed under discourse theory, just as political and cultural change cannot be subsumed under the concept of natural selection. Furthermore, the multiplicity of social agencies is supplemented by the multiplicity of natural agencies. Every animal species has its own ontology (Ingold 1992) and other natural forces, whether ocean currents, black holes, atoms, or the sun, have their own type and structure of agency.

Within the context of multiple agencies, hybrids of human and natural agents, whether they are cyborgs—described succinctly by Haraway (1992:42) as "compounds of the organic, technical, mythic, textual and political"—or quasi-objects (Latour 1993), must be included in ecological analysis and the respective structure of their agency taken into account. A problem emerges, however, when all agents are understood as hybrid, because their distinctive natural and social agencies are then eliminated as a result of their fusion. Rabinow (1992:241–42), for example, introduces the concept of biosociality, in which "nature will be known and remade through technique and will finally become artificial, just as culture becomes natural." McKibben (1989) notes that large parts of nature have been

modified or invaded by human action, which characterizes the current epoch as heralding the "end of nature." Yet there are many things in the universe either that have no human imprint or that have been touched by humans and yet still retain their distinctive natural agency. One good example of a natural-cultural hybrid could be a solar panel, but the sun, an essential aspect of the hybrid, is clearly a natural agent that has not been modified by humans.

Scientific understanding of the ecological dynamics of natural systems has also undergone changes because the earlier trends in natural ecology that emphasized equilibrium, homeostasis, and stability have, beginning in the 1970s, gradually shifted toward new emphases on disturbance, catastrophe, and non-equilibrium dynamics. Rappaport (1990:45) cautions, however, that "attention to disorder and disturbance does not preclude attention to order and regularity." Regarding the interface of natural and social systems, Holling & Sanderson (1996) postulate a disharmony that is founded in the notions of management and purpose: Management occurs in human societies, particularly in modern ones, where it demonstrates a strong tendency to maximize a narrow range of values, but it is not common in natural systems; and purpose, in which cross-generational social learning operates as an important variable in social systems, is unknown in natural systems. Early on, Bateson (1972) called attention to the dynamics that result from the union of conscious purpose, which tends to be linear, with the circularity of cybernetic and biophysical systems. He found that this interaction produces neither predictability nor randomness but rather stochastic processes within which both random and selective forces are operating (Bateson 1979). Recently, the concepts of autopoiesis, self-organizing systems, and complexity have served as powerful organizing motifs in research on stochastic dynamics (Jantsch 1980, Prigogine & Stengers 1984, Kauffman 1991).

These developments have led to radical questioning of the established notions of adaptation (Singer 1996) in the search for ways to effectively bridge the nature/culture division. Political and economic processes must be incorporated into the biophysical adaptive situation, not only to provide historical specificity to human/environment interaction, but also to identify factors that "perpetuate unequal adaptive potential" (Thomas 1998:64). In such a context, questions of, for example, whether the system of slavery implanted in the Americas was efficient as a mechanism for plantation owners adapting to New World ecosystems, or whether the underclass in contemporary societies adapts to hostile urban environments of violence, drug abuse, and structural unemployment, reveal the serious shortcomings of a strict adaptationist program. The theoretical and substantive evaluation of adaptation is at the core of the efforts of biological and cultural anthropologists toward "building a new biocultural synthesis" (Goodman & Leatherman 1998).

Global, Regional, and Local Levels of Analysis and Articulation

The delimitation and use of multiple levels of analysis, where each level demonstrates a degree of internal articulation, has a unique set of agents, and operates

according to its own dynamic, is providing new insights into the relationship between human groups and their environments. In anthropological ecological research, different kinds of generalizations are obtained from different levels of analysis (Bennett 1976). In biological terms, the distinction has been made between "ecosystem people," whose subsistence is tied to particular local-level ecosystems, and "biosphere people," who draw their support from resources obtained at a planetary level (Dasmann 1988).

When the planet is the environment of analysis, humanity is the population of study for anthropologists. Although such a large and complex environment involves enormous methodological and empirical difficulties, it is often the only adequate level of analysis for such environmental problems as the increase in size of the hole in the ozone layer, global warming, and the biophysical and social impacts of the El Niño ocean current. Human ecology research on global climate change considers the impacts of this change on regional biocultural systems (Gunn 1994) and the human causes of these changes (Stern et al 1992). Research on deforestation and subsequent secondary successional regrowth in Amazonia has benefited from new techniques that combine planetary-level information obtained from satellites with local-level knowledge derived from onsite interviews and observation (Moran & Brondizio 1998). In general, the use of satellites and other remote sensing devices, including geographic information systems technology, provides a host of new possibilities for anthropological ecological research, particularly in the area of land-use patterns and changes (Conant 1990, Guyer & Lambin 1993).

Global-level phenomena have become increasingly important in political ecology research because of the planetary dimension of many environmental problems and issues and the recent intensification (Harvey 1989) of long-term processes of globalization (Wolf 1982). Altvater (1993) undertakes an energetic analysis of the world economic system whereby the pillage by multinational corporations of islands of syntropy—highly ordered geological areas such as oil deposits, coal mines, or gold veins—as a means of increasing their production results in the global export of entropy. Durham (1995) developed a model of the political ecology of deforestation of tropical rainforests in Latin America that includes one positive-feedback loop that corresponds to capital accumulation, which generally occurs at national and global levels, and another that is linked to impoverishment, which primarily is a local and regional phenomenon (see also Rudel & Horowitz 1993, Sponsel et al 1996).

The increasing relevance of global-level phenomena to human groups changes the very meaning of the local. On the one hand, local presence of global phenomena produces a situation described as "glocality" (Robertson 1995). On the other hand, the manner in which social actors behave and conduct local politics changes when global influences are present. In fact, not only is the notion of what is local an issue, the determination of who is best situated to represent local groups also has become an issue, as exemplified in the case of different Amazonian social agents (Ribeiro & Little 1998). O'Connor (1998:299–305) suggests that the slogan "think globally, act locally," which orients both the Greens and the

leftist social movements, should be supplemented with the slogan "think locally, act globally," in order to foster a viable and effective "international red green movement."

The new interest in global-local dynamics should not obscure the crucial role played by intermediate regional and national levels of analysis and articulation in the intricate processes of mediation and linkage of local and global levels. A study of a regional market system in Western Sudan employs four different levels of analysis in order to capture the intricacy of the market places, channels, and strategies that comprise the system (Reeves 1989). Ribeiro (1994) shows how a major hydroelectric dam on the Argentine-Paraguay border fails to promote development as a result of the unequal distribution of power and differing degrees of articulation of transnational, national, regional, and local levels of agency. The conflicts between locally based (often indigenous) nations and the official state over control of and access to natural resources are the source of what Clay (1994) refers to as the twentieth-century "resource wars." These conflicts also highlight the differing cultural and political bases of distinct levels of articulation.

The difficulties in delimiting distinct levels and in identifying the agents and dynamics internal to each are compounded by the need to theorize about the relationship between levels and to make it operational. DeWalt & Pelto (1985) provided a good introduction to these issues when they outlined a methodological framework for linking micro with macro processes in a micro-macro nexus (Bennett 1985). Under the influence of new developments in chaos and complexity theory, recent work is positing the metaphor of "fractalness" as a way of ethnographically detecting the irregular, asymmetrical power connections that unite social actors who operate at different levels of social scale and whose actions often produce unpredictable results (Little 1996). In this regard, Harries-Jones (1998) makes the additional point that cross-level political actions must be combined with the cross-scalar dynamics of natural systems.

Environmental History and Historical Ecology

An explicit concern with the history of ecological interrelations has led to the development of separate fields of environmental history (see Worster 1988b) and historical ecology (see Balée 1998), which roughly correspond to the political/human ecology division outlined above, which have distinct transdisciplinary emphases, and which have their respective journals of debate: *Environmental History Review* and *Historical Ecology*. A third term, ecological history, is also used to describe this area of research (Cronon 1983, Gadgil & Guha 1992, Radding 1997). All these terms describe a type of research that is interested in "deepening our understanding of how humans have been affected by their natural environment through time and, conversely, how they have affected that environment and with what results" (Worster 1988a:290–91).

Key insights derived from historical research in ecological issues have been provided by a reevaluation of the past impact of human beings on landscapes previously considered as pristine or as landscapes only minimally modified by past inhabitants, including specific indigenous peoples or unknown Paleo inhabitants.

Certain environments previously thought of as natural are now known to be arti-factual landscapes that were created, in part, by human societies of the past and that include, in the case of Amazonia, agricultural fallows, anthropogenic savan-nas, babassu palm groves, and sporadic, highly fertile sections of soil (Balée 1992). Not all such impacts, however, have been beneficial to human populations, nor have they necessarily been biophysically innocuous. Pyne (1993) provides a historical review of the widespread use of fire as an environmental management tool in different continents beginning from the Late Pleistocene, with major con-sequences for subsequent development of the burned ecosystems. Simmons (1993) documents how, in numerous regions of the earth, forest clearance, over-hunting, overfishing, introduction of exotic species into ecosystems, and soil ero-sion from agriculture have all been the result of millenary human activities that have modified the biophysical environment in innumerable ways. Recent archeo-logical and historical debates concerning the role of deforestation in the eclipse of the Late Classic Mayan Copan state (Abrams et al 1996), environmental degrada-tion within the Roman Empire (Hughes 1994), and the deforestation and soil ero-sion caused by early inhabitants of Easter Island (Bahn & Flenley 1992) represent still other results of this type of research.

Islands provide a biophysical laboratory for historical human ecology and archeological research to the extent that they contain microcosmic histories of natural millennial processes and provide clear geographic and social-scale parameters for understanding these histories (Kirch 1997). With the study of islands of different sizes (see Dewar 1997), new possibilities are emerging for developing long-term models of the changes in biophysical environments and the differential impacts of humans on those environments over thousands of years—models that can contribute to the creation of planetary-level models.

Ecological researchers must confront enormous methodological difficulties if they are to understand the historical conjunction of geological, biological, and cultural temporalities, which have temporal scales that range from billions of years in the first case, to millions in the second, and thousands in the third. For example, the dynamics of frontier expansion in Ecuadorian Amazonia that involve oil development, colonization, deforestation, and conservation activities include at once the geological time frame of the formation of underground oil deposits, the biological time frame of the establishment of world-record levels of plant and animal diversity, and the cultural time frame of developmentalist fron-tier expansion, and have generated such responses as the depletion of oil deposits, reduction of biological diversity, and social stratification (Little 1992).

The notion of imperialism, whether of the ecological (Crosby 1986) or Green (Grove 1995) variety, has been used to describe the biophysical dimension of European expansion. Based on a detailed chronicle of the biological expansion of Europe throughout the globe over a thousand-year period (AD 900–1900), Crosby (1986) argues that biogeographical factors were crucial to the success of Euro-pean imperialism, particularly regarding the introduction and ever-expanding use of Old World plants and animals in the Americas and Australia. Grove (1995: 486), in a detailed history of the territorial expansion of European powers

between 1600 and 1860 and the scientific study of the impacts of that expansion on tropical islands, documents how modern environmentalism "emerged as a direct response to the destructive social and ecological conditions of colonial rule."

Territory, Place, and Landscape

The concepts of territory, place, and landscape have served to reintroduce geographical space as a significant factor in ecological research. Work with foragers, fishers, pastoralists, and peripatetics has demonstrated how human territoriality has many motivations and is contingent upon different sets of circumstances (Casimir & Rao 1992). Malkki (1992:24) shows this in her work with refugees and exiles in Burundi and Tanzania and notes that "people are chronically mobile and routinely displaced, and invent homes and homelands in the absence of territorial, national bases." Almeida (1994) refers to a "war of the maps" in drawing a sociopolitical map of the Carajás region of Brazilian Amazonia in which the ethnographic information provided by marginalized populations is incorporated directly into the map, thereby revealing the overlapping and contested claims of all the residents of this region. These and other works on human territoriality move away from past ethological analogies and environmental deterministic approaches by developing ecological analyses that view all peoples, regardless of societal scale or ecosystemic constraints, as having the potential for territorial behavior.

The notion of place has also emerged as a means of situating peoples in contemporary social and environmental conflicts. Dirlik (1998) argues that place consciousness has strong political dimensions not only for the critique of universalist pretensions of development but also as a means of directly confronting the operations of global power. Similarly, Rodman (1992:640) sees place as a "politicized social and cultural construct" and Appadurai (1996) refers to the processes of the "production of locality." Tuan (1996) shifts attention from the psychological and social foundations of local places to the notion of "cosmos" as the cosmopolitan side of culture that offers a potential liberating counterpart to the dangers of provincialism and bigotry often found in the "hearth."

Landscapes—defined by Crumley (1994:6) as "the material manifestation of the relation between humans and the environment"—represent another means of introducing geographical space into anthropological analysis, where it can serve as a "laboratory of past human choice and response in which the effects of environmental change can be palpably understood" (Crumley 1994:7). An ecological understanding of landscapes involves analysis of the knowledge systems, productive practices, and religious rites that local peoples have developed over the course of centuries as a means of interacting with and gaining sustenance from their biophysical environments.

The spiritual relationship of Native American peoples in the United States to sacred centers at specific geographic sites unites religion and spatiality (Deloria 1994). With religious landscapes coming to the fore throughout the world, the new and expanding field of spiritual ecology brings into the ecological realm the

themes of sacredness and spirituality (Kinsley 1995, Gottlieb 1996), themes that are being explored in a new journal, *Worldviews: Environment, Culture, Religion*, founded in 1997. An aesthetic relationship with the landscape is also important and is exemplified by the Temiar peoples of the Malaysian rainforest who inscribe in their songs crucial forms of knowledge of their landscape in a manner that serves to "map and mediate their relationships with the land and each other" (Roseman 1998:111).

Ethnoscientific research has expanded remarkably over the past two decades, and ethnospecialities have developed in botany, zoology, entomology, ichthyology, agronomy, and pharmacology. Perhaps ethnobotanical research has experienced the fastest growth and international organization (see Posey & Overal 1990) and has attained a high degree of sophistication. One example is provided by Balée (1994) in a treatise that combines an extensive botanical description of local plants with a detailed analysis of the complex system of plant use and activity and forest management of the Ka'apor of Brazilian Amazonia. In the area of development, Ploeg (1993) shows how a precise knowledge of specific plots of land is crucial in the cultivation of potatoes for local farmers in the Andean highlands. Redford & Padoch (1992) document how both indigenous and folk knowledge and practices offer models of sustainable resource use in neotropical forests. The use of indigenous and other local knowledge systems has, for academia and development, important dimensions that involve the difficult process of brokering between local and Western scientific knowledge systems as a means of finding innovative, location-specific solutions to new development and environmental problems facing the world today (Sillitoe 1998).

THE ANTHROPOLOGY OF ENVIRONMENTALISM

The many environmental problems that have emerged from the multiplicity of interrelations between humans and their environments have been accompanied by a concomitant surge in environmentalisms, each with their respective environmentalists. The ethnographic analysis of and political involvement in these many environmentalisms on the part of anthropologists and other social scientists have generated, during the past two decades, a field of study in its own right. In this section, the pertinent literature is analyzed in terms of environmental movements, rights, territories, and discourses.

Environmental Movements

The study of social movements with environmental concerns has expanded the notion of environmentalism in anthropology to include not only explicitly environmentalist nongovernmental organizations (NGOs) in the northern hemisphere, but also a large number of movements in the industrializing nations of poor or marginalized peoples that are struggling with such environmentally based issues as control over and access to natural resources, encroachment on their

lands and livelihood, and protests against environmentally destructive development projects. The concept of the environmentalism of the poor developed by Martinez-Alier (1991) has been applied to India by Guha (1997:19–20), who mentions situations that have "pitted rich against poor: logging companies against hill villagers, dam builders against forest tribals, multinational corporations deploying trawlers against artisanal fisherfolk rowing country-boats."

Meanwhile, women's environmental movements tend to arise when gender is a determining factor in issues involving the division of labor, access to natural resources, and property relations in ways that are disadvantageous to women (Carney 1996). In efforts to maintain existing rights or to resist new policies that seek to extinguish them, the emergence of women's resistance movements that are directly related to environmental issues has generated the new fields of feminist political ecology (Rocheleau et al 1996) and ecofeminism (Towsend 1995, Merchant 1996).

One widely known environmental movement that combines the issues of the poor with those of gender is the Chipko movement of the Indian Himalayas that emerged in the 1970s. In a social history of the movement (Guha 1989), it is explained as one aspect of a long history of social protest in the region, particularly in regard to the resistance against forest management. The author emphasizes how this movement was able to unite private peasant concerns with public ecological ones. In a continuation of this history, Rangan (1996) describes how the Uttaranchal statehood movement has in many ways eclipsed the Chipko movement as the most powerful movement of protest in the region, although it is far less environmentalist in character and in fact promotes a strong developmentalist agenda.

The rubber-tappers of Brazilian Amazonia gained worldwide attention through their political strategies that combined local direct action with international environmental campaigns (Hecht & Cockburn 1989). Their confrontations with loggers and ranchers in the 1970s as part of their effort to protect the forest and their homelands rapidly evolved during the 1980s under the inspired leadership of Chico Mendes (1989). Rubber-tappers organized at a national level and simultaneously forged a strategic alliance with the international environmentalist movement when global environmental concern over deforestation was at its height. As a result, the support provided for the rubber-tappers union continued even after the assassination of Mendes, carried out by ranchers in 1988. The subsequent creation of several extractive reserves—an innovative, comanaged protected area under the rules of common property—gave the rubber-tappers and other extractivist peoples new legal support and spawned new forms of associationism (Allegretti 1994).

Local peoples do not only form structured social movements in defense of their interests, they also rely on a host of everyday forms of resistance in what Scott (1985) classifies as the "weapons of the weak." In a historical account of control of the forest in Java, Peluso (1992) analyzes the many confrontations between the "cultures of control" of state forestry agencies and the "cultures of resistance" of forest-based peasant groups that have been involved for centuries

in struggles for the control of land, trees, forest labor, and ideology. In still other cases, local, everyday resistance to the construction of hydroelectric dams has led to the establishment of national "impacted peoples" movements both in Brazil (Magalhães 1990) and in India (WF Fisher 1995).

Parajuli (1998:17) categorizes these many groups under the rubric of "ecological ethnicities," which he uses in reference to "those people who have developed a respectful use of the natural resources and consequently a commitment to creating and preserving a technology that interacts with local ecosystems in a sustainable manner," and that can include "peasants, indigenous peoples, rural inhabitants, fisherfolk, forest dwellers, nomadic shepherds, and a host of people marginalized by development projects and the programs of environmental modernization." What is particularly noteworthy about these ethnicities is that they represent viable, functioning, ecological alternatives to existing models of modernization and environmental destruction.

Within the First World countries, particularly the United States, movements for environmental justice have emerged among the poor and people of color. Harvey (1996:368) pinpoints one of the socio-environmental sources of these movements when he notes that "one of the best predictors of the location of toxic waste dumps in the United States is a geographical concentration of people of low-income and color." Bullard (1993:24) diagnoses the phenomena of "environmental racism" in the United States and chronicles the efforts of grassroots African American, Latino, Asian, Pacific Islander, and Native American groups to "organize themselves around waste-facility siting, lead contamination, pesticides, water and air pollution, Native self-government, nuclear testing, and workplace safety." Martinez-Alier (1997) places these movements in an international context by describing the unequal "ecological distribution of conflicts" involving the actions of multinational oil, mining, and agrobusiness companies that internationalize their toxic wastes and environmental destruction. Johnston (1994:229) summarizes the basic thrust of these varied movements: "Social justice environmentalism, with its emphasis on human rights and wrongs, calls for a reordering of priorities in decision-making systems, and for restructuring the balance and loci of power in the decision-making process."

Ethnographic and sociological analyses of environmental organizations within a national context exist in both First and Third World countries, as evidenced by analyses of movements in Brazil (Leis & Viola 1996), Canada (Harries-Jones 1993), India (Agarwal 1994), Ireland (Peace 1993), the United States (Snow 1992), and Venezuela (García 1992). On a global level, the "Amazonia for Life!" campaign coordinated by the Ecuadorian environmental NGO Acción Ecológica (1994) has made petroleum development in tropical forests the focus of an international campaign that has facilitated South-South interchanges between activists from Nigeria, Indonesia, Malaysia, Peru, Colombia, and Ecuador. Keck & Sikkink (1998:147) explore the ways that different "environmental advocacy networks," whose power resides in their "ability to generate and use information strategically," have been crucial factors in mobilizing and maintaining international campaigns against tropical deforestation in Brazil and Sarawak. McCor-

mick (1989) provides a good historical overview of the emergence and consolidation of a global environmental political space structured around intergovernmental organizations such as the United Nations and international environmentalist NGOs.

Environmental Rights

The complex domain of environmental rights refers to those cases where the claims and rights of peoples to territories, natural resources, knowledge systems, and even their bodies are being ignored or abused (Miller 1993). The rights of indigenous, or "first peoples" (Burger 1990), to the lands and natural resources they have historically occupied and continue to use have been a central focus of anthropologists working with these groups (Chirif Tirado et al 1991). The territorial rights of these peoples are now being analyzed from the vantage point of their historical patterns of and future potential for the environmental protection of their respective lands (Cárdenas et al 1992, Schwartzman & Santilli 1999). On an explicitly political level, the rights of indigenous peoples to their territories are also analyzed with regard to the concepts of sovereignty (Goldtooth 1995), autonomy (Bartolomé 1995), and self-determination (Hannum 1996).

Anthropological research on property rights has ethnographically documented numerous cases of existing common property regimes located in all parts of the planet that involve a wide variety of natural resources (McCay & Acheson 1987, Bromley 1992). In refinements of common property theory, Guillet (1992) analyzes autonomous Andean "irrigation clusters" that harbor both pre-Columbian origins and modern innovations and that remain a building block of Andean irrigation organization; Johha (1994) describes how common property regimes fulfill crucial roles in the daily subsistence activities of poor peasants in India; and Berkes (1996) emphasizes the importance of local institutions and their role in maintaining feedback loops between natural resources and the common property regime. Meanwhile, Park (1993) offers a critique of common property theory within the perspective of arid, high-risk lands by noting that, although common property can function as a long-term, collective means of coping with high-risk environments, such situations can often be based in stratified, authoritarian social systems rather than in a community of equals.

The rights to environmental knowledge developed and used by indigenous peoples and rural farmers have become a highly contested issue as a result of the growth of multinational biotechnology firms and their search for scientifically unknown, highly valuable plants, which has taken them to remote parts of the globe and placed them in contact with the local people (Peritore & Galve-Peritore 1995). One response by local groups has been to issue calls for payment of royalties for use of their knowledge, and a more anthropological one has called into question the clash of cosmovisions whereby "western legal concepts of 'originality' and 'innovation' embedded in intellectual property law are not only sharply at odds with their indigenous counterparts, but are primed to serve the interests of biocolonialism" (Whitt 1998:34).

Davis (1993:21) presents an anthropological critique of the current discussion on biodiversity prospecting and intellectual property rights by arguing that it fails to comprehend the "sacred or spiritual quality of indigenous plant knowledge," and Orlove & Brush (1996) review the varying ways that local peoples can and do participate directly in the conservation of biodiversity resources. Cleveland & Murray (1997:510) show that indigenous peoples have widely varying, autochthonous concepts of intellectual property that diverge from the Western industrial model and conclude that a broadly conceived notion of sustainable agriculture is needed, one that serves the goals of "promoting both livelihood security for farmers at the local level and the world's food security."

The patenting of genetic material collected on lands belonging to the local people that is subsequently modified in the laboratories of biotechnology firms has been criticized by both indigenous organizations and anthropologists because these firms have refused to recognize that in many cases this material harbors centuries of human selective input, and because this material is being privatized on the sole basis of their manipulation. The indigenous outcry over the US patent issued for *ayahuasca*, an Amazonian hallucinogen used ritually for centuries by indigenous groups, and the controversy over the neem tree in India (Shiva & Holla-Bhar 1996) are just two of a host of cases that have emerged over the past few years and serve as a portent of future conflicts. All of these issues are being debated at local, national, and international levels, where social scientists are playing central roles in framing debates, including those over local (Estado do Acre 1997) and national (Silva 1996) biopiracy laws, the codification of the Convention of Biological Diversity ratified at the 1992 Rio Earth Summit (Posey & Dutfield 1996), and the implementation of the Trade-Related Aspects of Intellectual Property Rights agreements of the Uruguay Round of the General Agreement on Tariffs and Trade (Grenier 1998).

The issue of the rights to one's body has centered on the Human Genome Diversity Project (Weiss 1998:295–98) and has created divisions among anthropologists. On one side are those biological anthropologists who were involved in drawing up the initial list of 722 indigenous populations from around the world for use as subjects in genetic studies, and on the other side are those social and cultural anthropologists, many of whom have developed strong critiques of colonialism, and who argue that the project considers its subjects to be "much like the 19th-century anthropological 'primitive', who, envisioned as vestiges of an earlier moment in human history, represented a mirror on the past" (Cunningham 1998:212–13). The defense of the rights to one's body also questions the patenting of discrete human organs, tissues, cells, and genes and criticizes the lucrative global market in body parts (Kimbrell 1996).

Environmental Territories

The numerous national parks, biological reserves, wilderness areas, and other protected areas that have been established by governments throughout the world, along with a host of UN-designated Biosphere Reserves, have their origin in the wilderness preservation current of the environmentalist movement. Protected

areas encompass specific geographic spaces, have designated social purposes, and are managed by political institutions, which makes them both natural and human territories (Little 1996). One promising line of research is the documentation of the human processes behind the establishment of protected areas and the description of the environmental philosophies or cosmologies that undergird them. Foresta (1991) offers a detailed reading of the varied social actors—local environmentalists, the military government, international NGOs, natural scientists—who were involved in the process of establishing protected areas in Brazilian Amazonia during the 1970s and 1980s and shows how they were influenced by the reigning scientific theories of conservation of the time, most notably by the Pleistocene Refuge Theory, the Island Biogeography Theory, and Phytogeographic Mapping.

Barretto Filho (1997) extends this research in an explicitly ethnographic direction through a comparative study of the processes of analysis, proposal, creation, and management of two Brazilian Amazonian protected areas, with the additional factor that they are inhabited by traditional riverine populations. Cases such as these raise the even broader topic of parks and people, involving the multiple conflicts and issues that emanate from those sites where traditional and/or indigenous peoples have long utilized natural resources, but which have since come to be classified as protected. These debates are directly tied to the increasing visibility and power of social movements that are defending their environmental and human rights and, in spite of the generalized conciliatory tone of the parks and people literature, two basic perspectives—a conservationist one and an indigenist one—are still clearly evident.

In a broad-based theoretical attempt by conservationists to get a handle on this issue (West & Brechin 1991), the topics of displacement, ecodevelopment, and planning are explored within the framework of the concept of resident peoples, which defines highly diverse societies in relation to their presence in protected areas that are taken for granted as an existing good. Amend & Amend (1992) document that 86% of the national parks in South America are inhabited or regularly used by local peoples and propose the establishment of environmental education and consciousness-raising programs for these inhabitants. Integrated conservation and development projects are also being implemented in numerous countries, but they operate under the principle that "once biological criteria have been taken into account, then social and political criteria should be considered" (Brown & Wyckoff-Baird 1992:12). The "Parks in Peril" program launched by the Nature Conservancy in 1990 (Brandon et al 1998) also seeks rapprochement with local peoples, although it does not question the underlying philosophies and actual practices that led to establishment of protected areas on lands where people have lived for long periods of time.

Neumann (1998:9) rejects many of these conservationist assumptions by arguing not only that national parks are "active sociopolitical forces in their own right" but also that they are "historically implicated in the conditions of poverty and underdevelopment that surround them." Gray (1991) expresses concern over how conservation policies involve the potential for major violations of indige-

nous peoples' human rights and outlines the dangers of the subordinate incorporation of indigenous peoples in the market, the theft and commodification of their knowledge, the social engineering geared to make them useful to external interests, and their controlled assimilation. Diegues (1996), based on extensive work with traditional *caipira* populations of the Brazilian Atlantic forest, criticizes the imposition in Latin America of what he calls the Yellowstone model of protected areas and argues that ecosystems are best protected when the traditional peoples who have managed them in a sustainable manner for generations are left in place and granted communal title to these lands.

In an attempt to orient these debates, McNeeley (1993:253) offers a set of principles that "could help demonstrate that integrating conservation with development of local human communities is both relatively painless and likely to lead to enhanced benefits to the community, the nation, and the world." One of the most ambitious efforts in this respect was the international Pucallpa (Peru) Conference held in 1997, which brought together indigenous leaders and conservationists in an effort to assess the state of the question and develop joint future work (Gray et al 1998). Ecotourism has also emerged as a possible means of promoting conservation and at the same time of offering local peoples a source of income through activities that place economic value on their local skills and knowledge (Boo 1992). Such endeavors, although appearing good on paper, run into a host of practical problems, be they cultural ones around the deployment of neoprimitivist ideologies (MacCannell 1992) or economic ones, such as the emergence of internal social stratification in previously nonstratified societies as a result of the profits gained from tourist services controlled by one clan at the expense of rival clans (Little 1992:121–141).

Environmental Discourses

The ethnographic description and analysis of the multiple ways that human societies conceptualize their relationship to their human and biophysical environments has served to relativize the Western concepts of nature and culture. Bird-David (1993), in a comparative analysis of tribal societies from Australia, Africa, Asia, and North America, describes different forms of "metaphorization of human-nature relatedness" that include such metaphors as sexual intercourse, procreation, and namesake and adult-child relatedness. Various analyses of ethnographic material from Amerindian societies in Amazonia are calling for a reevaluation of animism as a contemporary means of understanding human-nature relations (Descola 1998). Århem (1996:200–1) describes Makuna eco-cosmology, in which "animal 'others' are treated as 'equals' and 'persons,' parties to a moral pact governing relations within human society as well as the grander society of all beings." All of these examples diverge from the Western object-subject relationship to pose distinct types of subject-subject relationships between nature and humanity. The cross-cultural study of discourses of human-environmental relations has bred a host of theoretical propositions calling for the development of a grammar (Descola 1992), a cognitive geometry (Ellen 1996), or a meta-language (Hviding 1996) to be used in comparative epistemology.

Analyses of Western discourses on the natural environment have focused on such core concepts as nature (Evernden 1992, Cronon 1995), wilderness (Oelschlaeger 1991), ecology (Bramwell 1989), and environmentalism (Milton 1993, Pepper 1996). Other studies explore marginal and/or counterhegemonic discourses that are emerging in the West. Ecofeminist thought offers ways of critiquing the dominant Western mode of understanding the human/environment relationship and has developed differing essentialist (Shiva 1989) and political (Agarwal 1992) currents. Merchant's (1992) review of radical ecology includes analyses of deep, spiritual, and social variants in ecology. Experimental nature-writing is also emerging as a force for reconceptualizing and resensitizing the relationship between nature and culture, with the magazine *Terra Nova: Nature and Culture*, founded in 1996, as a locus of such writing.

The ideological critique of sustainable development (Redclift 1987) has several anthropological thrusts: Ribeiro (1991:83) views it as a "metanarrative with utopian characteristics that establishes a common discursive field, creating possibilities for alliances between environmentalists and those social agents interested in economic growth"; Escobar (1995:196) argues that the term represents an "inscription of the economic onto the ecological" that has the effect of affirming and contributing to "the spread of the dominant economic worldview"; and Little (1995:268) shows the potential this term has for the construction of a new international political cosmology, but describes how, at the Earth Summit in Rio de Janeiro, it was part of a "global magic act, in which the leaders of the world solved their problems through the invocation of discursive catchwords." Researchers working at the grassroots level who are documenting the sustainable ways that local groups have of interacting with local ecosystems have begun to promote the terms sustainable lifeways (Taylor 1995) and livelihoods (Fox 1996, Amalric 1998).

The discursive appropriation of indigenous peoples as natural conservationists and tropical forests as pristine habitats by northern environmental movements has created an arena of heated anthropological debate (see Headland 1997). Redford (1990:27) critiques the notion of the "ecologically noble savage" and argues that as indigenous peoples enter into contact with the Western world, they reveal "the same capacities, desires, and perhaps, needs to overexploit their environment as did our European ancestors" (for a modified position see Redford & Mansour 1996). Edgerton (1992) also "challenges the myth of primitive harmony" by documenting a host of "sick societies" that have made maladaptive decisions in the past and then maintained them, sometimes driving themselves into extinction. Sponsel (1995:283) rebuts this position with the forceful argument that "for millennia, these [Amazonian indigenous] people have developed the land, generally in ways that used land and resources on a sustained basis without major, irreversible environmental degradation and destruction." Bodley (1997:612) takes up what can perhaps be taken as an intermediate position and affirms that "when a group has no politically or commercially driven cultural incentive for expanding its population, production, and consumption, its members do not need to be self-conscious conservationists."

Regarding the discursive appropriation of the Amazonian rainforest by environmentalists, Fisher (1996:196) chronicles the way the perception of Amazonia as wilderness was consolidated in the twentieth century with the effect that "indigenous peoples disappear from the social history of the area and from the policy recommendations of local administrators only to be later resurrected as part of the natural attributes of the wilderness region." Nugent (1993) makes a similar argument regarding Amazonia's *caboclo* population, which for years were "invisible" in Amazonian anthropological research and even today, with the new interest in environmental issues, are still not recognized as a historically specific peasantry that was forged from the economic forces of Amazonian colonial history but rather are recognized as examples of sustainable development. Arnt (1992) describes how a naturalist allegory for understanding Amazonia was a key element in the development of Brazil's nationalist ideology and how this ideology was then made a pretext for the rapacious exploitation of this region in the name of national development.

The flip side of these analyses concerns the ethnographic presentation of how Amazonian indigenous peoples are responding to their appropriation by environmentalists. Conklin & Graham (1995:696–97) postulate the existence of a "middle ground of Amazonian eco-politics" involving indigenous peoples and environmentalists as a "political space, and arena of intercultural communication, exchange, and joint political action." They also highlight that "there is an inherent asymmetry at the core of the eco-Indian alliance." Albert (1993:368) analyzes the way the contemporary political indigenous discourse of Yanomami shaman and political leader Davi Kopenawa Yanomami involves both the selective incorporation of elements of the external environmental discourse and the reelaboration of Yanomami cosmology, such that from the "indigenous point of view, the political interculturality of ecological discourse cannot be maintained." Regarding the Kayapó, both Turner (1991) and Fisher (1994) downplay the role of environmentalism and instead place ethnographic emphasis on the resilience, flexibility, and creative use of Kayapó internal social structures and political strategies.

All these critiques are linked to the even broader issue of how environmental discourses are constructed at a global level and point to the difficult cross-cultural issue of developing a global discourse that is shared rather than imposed. Shiva (1993:150) takes the latter position and argues that "the global does not represent the universal human interest, it represents a particular local and parochial interest that has been globalized through the scope of its reach." Milton (1996:218) explores the possibilities of a shared position by showing how global environmentalist discourse "encompasses a number of transcultural perspectives which both compete and overlap with one another" and outlines a specific role for anthropologists in the study of global discourses. Yearley (1994:167) postulates that environmentalism has a type of global specificity based in the three factors of "its intimate relationship to science, its practical claims to international solidarity, and its ability to offer a concerted critique of, and alternative to, capitalist industrialism."

PROSPECTUS: FACING A NEW MILLENNIUM

Although admittedly much of the hoopla over the coming of the Third Millennium is both arbitrary and ethnocentric—arbitrary because it reflects a particular fetish with round numbers, and ethnocentric because it places all human history within a Western, Christian calendar—it nonetheless can be used for the purpose of pausing and reflecting on recent dramatic changes in human/environment interrelations and, from that vantage point, taking a prospective look at emerging methodological, political, and ethical issues that will dominate the coming years.

A central theme in this review has been that the concept of the environment provides a powerful tool with which to understand some of the complexities of life on earth and the role played by humans as an integral part of those complexities. One of the most salient aspects of new technology is its power to transform existing environments and generate new ones. As new environments emerge and grow in importance, new types of ecological analyses will be needed to understand the interrelations that human groups maintain with them. Four such environments—urban, virtual, viral, and warfare—are briefly mentioned as harbingers of the future.

The accelerated urbanization of the earth's human population during the twentieth century has turned urbanism into a global ecological issue and transformed the immediate environments of an increasing number of humans into urban ones. Some important research issues that these environments pose are: urban environmental history, urban landscapes, urban ecology and health, urban sustainable development, and urban environmental rights. Virtual environments, most notably the much-hyped and little-understood cyberspace, are changing the ways that humans construct identities, organize themselves, conduct politics, and relate to the biophysical environment. Research on the interrelations between humans and their virtual environments involves an interdisciplinary dialogue among the informational, psychological, and anthropological sciences, where the very means of studying these interrelations can involve extensive use of cyber research techniques.

The speed with which bacteria, viruses, and diseases move across the globe today requires that anthropological ecological research focus on viral environments and the multiple types of human interrelations that serve to channel, propagate, deflect, and/or disrupt the transmission of these microorganisms. The already voluminous literature on AIDS is being supplemented by research on epidemiological history, demography and disease, and the new, uncharted terrain of the cross-transmission of viruses between humans and nonhuman animals, such as the recent cases of British mad cow scare and the Hong Kong chicken slaughter show. Meanwhile, the protracted wars in the Balkans, Central Africa, the Caucasus, the Middle East, Colombia, Afghanistan, Angola, Guatemala, and numerous other sites make warfare environments a tragic, but essential, area of research in which the conjuncture of military technologies, topography, global geopolitics, ethnic loyalties, local resource struggles, and environmental degradation must be understood in their dynamic interrelation.

The establishment of new environments and the problems that emerge from them, invariably breed new environmentalisms that can, and are, being studied ethnographically in what is called in this review the anthropology of environmentalism. This research has highlighted the growing role and size of the civil society operating at all levels of social scale. As anthropologists study environmental movements, they simultaneously become witness to the serious environmental problems facing local peoples, often as the result of powerful outside interests, and become involved in the issues of human and environmental rights.

The combination of ecological and ethnographic approaches to the environment provides an expanded anthropological research field that offers new possibilities for uniting empirical research with the political and environmental projects of human groups that are facing pressing, often life-threatening, problems. This represents one of the broadest and most innovative developments in environmental research in anthropology and broaches many of the issues that Sponsel (1995) raises with regards to indigenous peoples in his call for an (external) "paradigm shift" in ecological anthropology that incorporates new trends, priorities, and audiences from both applied and advocacy anthropology, a call that complements the (internal) paradigmatic transformations mentioned earlier.

These transformations in the ecological paradigm are responding to serious, worldwide social and environmental problems that are operating within what Beck (1992) calls the risk society, which is based in the distribution of "bads," or dangers, as opposed to the industrial society, which is based in the distribution of goods. He adds that the creation of these risks increasingly eludes the control by protective institutions of industrial society. Murphy (1994:250), in noting that many past societies have been risk societies, specifies the peculiarity of the current historical moment as lying in the fact that today's human actions "imperil life on the planet" and "have potentially global effects on ecosystems." This is also the point made by Serres (1995:20) in noting that humanity's new technological and scientific powers have reached such proportions that our "being-in-the-world [has been] transformed into being as powerful as the world." This provides the basis for his call for a "natural contract" between humanity as a new, total subject and planet earth as global nature.

Of course, planet earth may not be interested in signing on. From the perspective of billions of years of geological and biological development, human presence and impact on the earth may well be insignificant. Lovelock (1988:159) reminds us—working from the premise of Gaia—that "it is not much comfort to know that, if we inadvertently precipitate a punctuation, life will go on in a new stable state. It is near certainty that the new state will be less favorable for humans than the one we enjoy now." Nonetheless, the rapid destruction of the world's biodiversity (Wilson 1988), a product of nearly four billion years of evolution, at the capricious hand of humans, and the destruction of the world's sociodiversity (Neves 1992) as a result of the policies of powerful global and national economic and political agents, represent a dramatic and troubling development for all species interested in the long-term survival of life on earth.

Hence, the documentation of the impacts that humans have made and continue to make on the planet, impacts that have reached an unprecedented scale and are creating major disturbances in the world's natural cycles, raises the specter of driving ourselves, and many other species, into extinction. Kohák (1997:13) cogently summarizes this situation: "The survival of the human race and its mammal and vertebrate kin on this earth depends upon our willingness to accept the responsibility that goes with our freedom." Along with responsibility, another theme that crops up repeatedly in the literature, and that comes from researchers on both sides of the natural/social scientific divide, is the need to develop a new attitude of caring for the earth and its inhabitants, human and other (Soulé 1995, Busch et al 1995, Merchant 1996). Caring, and the collective responsibility that it entails, offer essential bioethical guidelines for research and activism as environmental anthropology enters the twenty-first century.

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Local Knowledge in the Environment–Development Discourse

From dichotomies to situated knowledges

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Abstract ■ This article takes a critical look at the various approaches representing local knowledge as a scapegoat for underdevelopment or as a panacea for sustainability, these two representations characterizing the conventional environment–development discourse. The static oppositions of local versus universal knowledge are challenged by establishing more diversified models to analyse the relationships of heterogeneous knowledges. The study emphasizes the complex articulation of knowledge repertoires by drawing on an ethnographic case study among migrant peasants in southeastern Nicaragua. Knowledge production is seen as a process of social negotiation involving multiple actors and complex power relations. The article underlines the issue of situated knowledges as one of the major challenges in developing anthropology as an approach that subjects fixed dichotomies between subject and object, fact and value, and the rational and the practical, to critical reconstruction.
Keywords ■ hybridization ■ local knowledge ■ migrant peasants ■ Nicaragua ■ situated knowledges ■ traditional and modern

Introduction

In the past two decades, local knowledge systems have been the subject of increasing attention not only by anthropologists, but also by environmental researchers, biodiversity prospectors, development experts, businessmen and local people themselves. Local knowledge has been portrayed as a part of a romantic past, as the major obstacle to development, as a non-issue, as a panacea for dealing with the most pressing environmental problems, and as a critical component of a cultural alternative to modernization (Agrawal, 1995; Heyd, 1995).[1]

Conventionally, local knowledge has been represented as something in opposition to modern knowledge. As remarked by Kloppenburg (1991: 527–8), a wide variety of analysts, from phenomenologist philosophers to

contemporary anthropologists, have tried to illuminate the epistemological difference between local knowledge and scientific knowledge by elaborating a range of binary concepts: *la science du concrète/la science* (Lévi-Strauss, 1962), tacit knowledge/scientific knowledge (Polanyi, 1966), folk knowledge/universal knowledge (Hunn, 1982), indigenous knowledge/Western knowledge (Posey, 1983; Warren et al., 1995), and traditional knowledge/modern knowledge (Huber and Pedersen, 1997).

Characteristic of these dichotomies has been the view of local knowledge as practical, collective, and strongly rooted in place. According to Geertz (1983: 75), local knowledge forms a relatively organised body of thought based on immediacy of experience, while van der Ploeg (1993) speaks of the *art de la localité*, which is intimately linked to spatially specific practices. In this call for the location-specific, ethnoscientists have revealed sophisticated insights into indigenous knowledge systems and world-views. What has been rarely questioned in all this is the representation of local knowledges as monolithic and culturally bounded systems. As remarked by Moore (1996: 2–3), anthropologists have been happy to highlight the 'indigenous point of view' and to see the local people as producers of endogenous knowledge regarding natural resource management, cosmological theories and medical cures; however less attention has been paid to the contested and hybrid character of such knowledges. The concept that local people produce 'shared knowledge', which serves as a 'cultural totem' about 'how we know' (Cohen, 1993: 37), includes an implicit assumption of people living in closed communities and having unique ways of knowing.

Recent trends of post-structuralism and deconstructivism have challenged such ways of constructing the other. Many black and Third World scholars, postcolonial theorists and feminists have pointed out that the absolutist dichotomy 'either/or' that underpins Western philosophical thinking works in a discriminatory manner to structure representations of knowledges in specific contexts (Escobar, 1997; Haraway, 1989, 1996; Mohanty, 1991). It is based on a Cartesian model of the subject who knows and the object who is to be known. According to the post-structuralists, all knowledges are socially constructed, thus the focus of analysis should be on those processes that legitimize certain hierarchies of knowledge and power between local and global (scientific) knowledges.

The purpose in this article is to analyse the role of local knowledges in the current debate on environment and development by drawing on ethnographic research done among peasant colonists in Río San Juan, Nicaragua.[2] The two mainstream approaches – constructing local knowledge as a scapegoat for underdevelopment or as a panacea for sustainability – are critically examined. The study then aims to reconstruct an alternative view of situated knowledges which are simultaneously local and global. Such a perspective re-maps the fixed boundaries between rational and practical, and modern and traditional, that have characterized some of

the main disputes in anthropology in its current crisis of representation (Nash, 1997). It also opens up a new field of ethnographic analysis in which the principal research problem is no longer the local knowledge systems as clearly separated 'there', but the hegemonic discourses that authorize essentialist representations of heterogeneous knowledges.

Context: migrant peasants as disembedded others

In 1996, I became interested in nature-based conflicts in a protected area buffer zone in Río San Juan, southeastern Nicaragua. This humid tropical forest area, located in the municipality of El Castillo, belongs to the buffer zone of the biological reserve of Indio-Maíz, established in 1990. Indio-Maíz has acquired a great international reputation as one of the most outstanding protected areas in Central America. It belongs within the category of strictly protected areas: the only activities permitted in the reserve are scientific investigation and wilderness protection.

The establishment of the reserve has many implications for the livelihood opportunities of the surrounding forest-edge communities. The buffer zone of Indio-Maíz covers 180,000 hectares of land and has some 10,000 inhabitants. It belongs to one of the most intensive agricultural frontiers in the country, with high rates of immigration and deforestation. To secure the support of the local population, the programmes working for the protection of Indio-Maíz are linked to compensatory rural development projects in the buffer zone. In 1994–8, there were 30 projects with a total budget of US$21 million under way in Río San Juan involving agricultural diversification, community forestry, ecotourism, environmental education, local organization and women in development, with financing from various international aid agencies and NGOs (Veracruz, 1995).

Until the 1950s, there were scattered hamlets of smallholders in this buffer zone.[3] These households cleared small patches of forest for crop production, and they also practised small-scale extraction of rubber, *chicle* and precious timber species. During the 1960–70s, a wave of new colonists entered the region. They were principally smallholders from Pacific areas who had lost their lands to cattle estates and cotton plantations. These people without land began to open up the Río San Juan forests to slash-and-burn agriculture.

The Nicaraguan civil war (1979–90) largely depopulated the region. Most of the people left as refugees for Costa Rica or they were evacuated to government-established settlements and cooperatives located in the more controllable regions. Since 1990, a considerable number of the refugees and internally displaced people have returned to their farms 'in the interior'. At the same time, the flow of new colonists entering the region has dramatically increased. There is a high degree of mobility; people come and go, and many of them move ever further into the hinterland. The great

competition over resources promotes a high level of conflicts with varying degrees of violence (Utting, 1993: 147–50).

Most of the current inhabitants are peasant smallholders (*campesinos*), who cultivate basic crops by slash-and-burn agriculture and supplement their livelihood with small-scale forest extraction, logging and trading. Many of them also participate in two-step migration, which involves clearing land for pasture and then selling it to land speculators. A great many of these smallholders encounter a serious crisis of survival in a situation where access to free land has ceased, crop productivity is low and hierarchical forms of commercialization make it difficult for them to compete in national markets. The ongoing structural adjustment policies have only increased the economic hardships of many smallholders. All this has provoked a series of conflicts between the forest-edge communities, conservation agents and development projects under way in the region.

One of the main strands of my study concerned the everyday encounter between development experts and local population in this 'jungle', invaded by rural education campaigns. In such a politicized context, where interventions transcended the strict boundaries of time and space, I noted that the arguments of local knowledge as traditional knowledge, intimately linked to a particular place, transmitted from one generation to another, and going from 'practice to practice' (cf. van Beek, 1993; Berkes, 1993; Huber and Pedersen, 1997), could not explain the situationality of knowledges involved in these struggles of development and power. The categorical opposition between local and global could not illustrate the complex negotiation between diverse knowledges; rather, in order to understand the power of development discourses to tie local people into networks far beyond their control, it was necessary to analyse the local knowledges as highly situated ways of knowing, that have been subjected to multiple forms of domination and hybridization.

When explaining my research objectives, many anthropologists were amazed at my interest in studying the environmental knowledge of these 'forest encroachers', more or less contaminated by modernization. They really wondered whether it was worth studying the 'ethnoecology' of these peasant colonists, who had no autochthonous traditions. All this shows the powerful tendency within conventional anthropology to award high prestige to those who study 'intact cultures', while granting less attention to those interested in more complicated societies and their hybrid ways of knowing. As remarked by Nugent (1993: 40), in this discourse, non-indigenous peasants are still portrayed as incomplete others, too eroded by westernization to have that quality of 'pristine otherness' that would make them suitable for ethnographic research. All this means that in order to understand the complexity of migrant peasants' knowledge systems, we have to pay attention not only to the heterogeneity of their knowledges, but also to the situationality of anthropology and Western science, with their respective trends and marginalizations. In the following, the construction

of local knowledge as a discrete form of knowledge, either inferior or superior to scientific knowledge, is analysed in the light of the environment–development struggles in Río San Juan. The analysis then progresses to an alternative view of these migrant peasants' knowledge systems as knowledges that are being reconfigured within the ongoing struggles over resources and representations.

Local knowledge as non-knowledge

Traditionally, scientists and development experts have simply not wanted to see local forms of knowledge as having anything important to say. Scientific knowledge has been defined as a paradigm of knowledge, and the only epistemologically adequate one. This has resulted in a view of local knowledge as non-knowledge, that is based on irrationality and ignorance (Murdoch and Clark, 1994). Among the development experts working in Río San Juan, local knowledge was commonly seen as a constraint on progress and local settlers as confined by their traditional modes of thought. In one of the workshops held for training of the local people, a leading rural adviser[4] presented the following list of -*isms* which, according to him, obstructed the process of development in these jungle communities:

1. lack of will to change one's attitudes and customs (conformism)
2. lack of initiative to resolve one's problems (fatalism)
3. lack of responsibility; supposition that the government and development institutions should always help (parasitism)
4. magic traditions and beliefs (irrationalism)
5. lack of education (analphabetism)

Through such a representation, the local forest-edge communities were constructed as spaces of backwardness and their settlers as maladaptive parasites, imprisoned by their superstitions. They were rendered primitive and pre-scientific, and their capacity for progress was thought to depend on the intellectual skills of the rural advisers to unveil their ignorance and instruct them from the age of magic to the age of logic. The development agents were characterized as experts bringing civilization to barbarians, science to the superstitious, and well-being to those suffering from various lacks: lack of managerial skills, lack of sustainability, lack of environmental ethics and lack of long-term plans. To emphasize the difference between expert knowledge and local ways of knowing, the developers utilized a discourse that featured sharp contrasts: rational/magical, universal/particular, theoretical/practical and modern/traditional.

These dichotomies were powerful mind organizers, privileging one form of knowledge over another. Local knowledge was defined as knowledge of an out-of-the-way other, contrasted with progressive representatives of the expert world. This polarization served to elaborate the omniscience

of experts as opposed to the ignorance of the rural poor, the enlightenment of 'us' from the obscurity of 'them', and the rationality of science from the irrationality of local knowledge. The criteria of what constituted knowledge and who was designated as qualified to know, were articulated by developers who spoke for the others who had been rendered voiceless.[5]

Such exclusion became clear in the conventional encounter between conservation authorities and local peasants in Río San Juan. Many conservation agents constructed local environmental knowledge in such a way as to suggest that, although the local people live in a rich tropical habitat, they are unaware of its ecological diversity and ignorant of how to take care of it. They were deemed to be colonists who know how to tame the jungle with the *machete* but who do not know how to conserve tropical biodiversity; only the conservation agents were considered to have the capacity to decide how this tropical landscape should be used. This argument of knowledge difference was then utilized to reinforce the conservation authorities' right to control the local resource users, who were argued to be in need of effective governance and guidance in order to achieve a 'modern' environmental consciousness.

Local settlers responded to these accusations by pointing out that the appeals for local people to change their attitudes toward nature have little relevance to the extent that the power to make a difference in local resource management is so unequally distributed. They also challenged the relevance of all this care for biodiversity by critically asking whom it was supposed to benefit. All this demonstrates how developers imposed particular representations upon local knowledges, while at the same time ignoring all the alternative conceptualizations. The everyday system of these slash-and-burn cultivators of classifying plants and soils as hot or cold was likewise judged as parochial.[6] Their practice of burning the land cleared from the forest, considered fresh (cold), until maize as a hot crop could be sown on it, was condemned simply by claiming that their traditional belief in 'hot' and 'cold' was nonsense. In the transfer of knowledge 'from experts to clients', the role of local knowledges as symbols of social identity and as signs by which the local people interpret their relationships with past, present and future, was ignored, while the interaction between developers and those-to-be-developed was constituted solely by the experts' categories.

There were also those development agents who utilized local knowledge as a strategy to achieve the desired change in these buffer zone communities. In various development projects, the rural advisers spoke of the need to respect local traditions, such as the conception of the moon controlling the vitality of the plants, the belief in the evil eye causing illnesses, and the classification of soil fertility by observing the colour of the soil. They carefully argued that there is no scientific proof of the rationality of these concepts, but in order to gain approval among the targeted local groups, one had to show respect for their beliefs. This meant paying lip service to local knowledge in order to achieve success in one's development programme.

Characteristic of this discourse was a powerful theme of rationality which judged local knowledges in terms of their appropriateness. The main idea was the involvement of local people and the incorporation of their knowledges into global strategies of sustainable development; the contribution of anthropology to this task was seen as one of providing ethnographic 'hints' to enable developers to distinguish valuable information from irrelevant drivel in these alien knowledge systems.[7] All this meant that local knowledge was legitimized only if it conformed to experts' principles of sustainability, having no right as knowledge per se.[8]

This conception emerged clearly in the discourse of biodiversity, in which local knowledges were often seen as under-used mines of information to be shared for the benefit of humanity at large. It was the bioprospectors who were the most eager speakers on behalf of local environmental knowledge, seen as a culturally and socially free 'human capital' to be harnessed in the service of biobusiness. Many of them considered the 'unimproved' genetic material – wild species and traditional varieties of crops grown by local people – as an 'open-access resource', and the knowledge of its potential use as the 'common heritage of all humans'. At the same time, they promoted maximum protection for modern medicines and crop varieties as a private property, and monetary compensation for scientists and corporations who manipulate folk varieties in their laboratories.[9]

In this situation, the local people themselves critically remarked that 'what you call bioprospecting, we call biopiracy'; in this way they called attention to the fact that the view of local knowledges as gems of information follows a familiar pattern of outsiders extracting raw materials. This new, intellectual imperialism misconstrues local knowledges as collective and 'out of history', and thus available for appropriation into scientific and developmentalist procedures. All this was cleverly pointed out by a local healer, don Sefarino, in saying that 'Every year scientists come here to take sacks of samples of our medicinal plants, and pads of notes on our healing practices, and after having grabbed all this information, they disappear and never give us any compensation.'

Such a view also assumed that the relevance of local knowledges could be verified only when subordinated to the conceptual apparatus of science. The capacity of local people to innovate, systematize and transfer knowledge was seen as limited, while scientific knowledge was considered rigorous and cumulative. There was little recognition of the fact that in practice science is 'achieved' in much the same way as other forms of knowledge – through social construction and negotiation – despite the tendency of many researchers to hide the acquisition of resources behind the presentation of scientific facts as reality 'reveals' itself. The staunch faith in objective science among the developers concealed the fact that what we call modern science is itself a historical product of continuous struggle not only to define science in a particular way, but also to exclude other ways of producing knowledge from that definition.[10]

Local knowledge as a holistic way of knowing

Today, there is an increasing number of environmentalists and alternative movement activists criticizing the hegemony of science and emphasizing the necessity of creating space for competing modes of knowledge. According to many of them, it is time to replace the reductionist framework of science with a methodology that draws its guidelines from non-Western traditions, based on holistic ways of knowing and ecologically evolved learning to live in equilibrium with nature.

This perception was fairly common among the environmentalists and alternative developmentalists working in Río San Juan. The matter was conceptualized as follows by one of the alternativists interested in rural empowerment in the buffer zone communities:

> Western science has for centuries oppressed rural people and their traditional knowledge. Instead of considering us as experts, we should admit that we are apprentices and have enormously to learn from the local people. They know their environment intimately and they have deep knowledge of the local ecosystems. You as anthropologist should help us in preserving this practical wisdom, totally different from scientific abstractions.

According to alternative developmentalists, local settlers were 'minimal disturbers of nature', and 'admirable scientists of the concrete' (Malkki, 1992: 29), genuinely unfolding the hidden innards of the local habitats. Their knowledges were portrayed as utilitarian, responding to precise everyday problems, in contrast to scientists' theoretical deliberations.

All this meant the resurgence of a new range of polarities, in which human knowledge was once again characterized as being composed of two opposing archetypes: Western science was constructed as reductionist and theoretical while non-Western knowledge was considered holistic and practical. These two knowledge systems were seen as highly segmented and occupying different cultural spaces, with little exchange of information between them. All this led to essentialist visions of local knowledges and romantic images of 'noble savages'. The non-industrial people were seen as paragons of ecological virtue, with scant attention paid to the existing diversity of environments, cultures and histories, and to the larger questions of knowledge and power. The image of rural communities possessing primordial environmental wisdom formed the basis of these radical environmentalists' critique that modernity per se was responsible for environmental destruction.[11]

All this was closely involved within global environmental discourses in which local knowledge is acquiring a strategic value in the environmentalists' humanist stance of defending disempowered people and not just protecting flora and fauna. This concerned especially the environmental knowledge of indigenous people. In recent years, the rainforest Indians and their environmental skills have become key symbols in transnational

politics. These alliances between environmentalists and Indians are often founded on the assertion that native peoples' environmental knowledges are consistent with Western conservationist principles: The Indians are represented as 'guardians of forest', and as 'people dwelling in nature according to nature'. Such images ignore the complexity of indigenous knowledges and they also contradict the priorities of many native peoples who seek control over their resources by these alliances, while the environmentalists need Indians and their traditional knowledges in order to provide a 'human face' for their global strategies of sustainability. There is a risk that the Indians are approved as useful partners in these alliances only to the extent that they conform to Western images as 'authentic others' who demonstrate stewardship qualities toward nature (Conklin and Graham, 1995).

The peasant colonists have the bad luck of being relegated as evil others even by this discourse. When comparing the images of indigenous versus non-indigenous rainforest dwellers in the global environmental discourse, in the representations of the Indians there are precious tropical forests, rivers and mountains, huge trees with orchids and toucans, and delighted children with canoes and crossbows in the enchanted wilderness. This paradise, associated with ancient roots, time-tested lifeways and primordial mysticism, is in danger of being lost because of the terrible encroachment of non-Indian colonists, portrayed as unruly forest ravagers. There are representations of colonist families in their rustic huts and muddy *patios*, with pigs wandering here and there, men listening to the transistor radio and women caring for lean children with ragged clothes. All these images are based on a sharp dichotomy according to which tropical forest dwellers either are ecologically noble or they are not. The Indians are essentialized as peoples of simplicity, purity and environmental wisdom, while the non-Indian colonists are portrayed as rootless, corrupted and lacking environmental knowledge.[12]

Such a perception was implicitly constructed by one of the project leaders working for an international environmental movement in Nicaragua when explaining to me that:

> . . . we prefer to work with indigenous people rather than with colonists, because the Indians have rich, accumulated knowledge of the rainforest and they still preserve their traditional practices of nature conservation. This offers us much more potentiality for global conservation, because they are more aware of our objectives.

According to him, the peasant colonists possess the 'mentality of pioneering' and the 'culture of mining', with no ethics of conservation. They were portrayed as 'malignant children of Malinche', haphazard meldings of Western and non-Western, and as 'vagabonds roving here and there'. When the Indians were associated with tropical flora and fauna as part of the overall spectacle of natural wilderness, the colonists, portrayed as 'men

combating the forest', belonged to culture, spoiled by the evils of modernization.

These images dismissed local forest dwellers as social actors and the historical construction of their knowledges. There was no notion that both colonists and indigenes are 'people of the forest', although they have shaped the tropical landscape in different ways. Through categorical cultural representations, the power structures that mediate the struggle between competing knowledges and environmental ideologies were alienated. The forest-clearing activities of non-Indian colonists were attributed to their primordial 'land hunger', or to their cultural 'forest phobia', with no references to the wider contextual factors – such as agrarian policies, land tenure regimes and market forces – which have reinforced a land use pattern of forest conversion in most tropical forest areas.

Characteristic among the advocates of alternative knowledges was also an idealist assumption that it is possible to get rid of all forms of domination by simply replacing scientific hierarchies with alternative bottom-up approaches. Many of them insisted that their methodologies of 'thinking from below' successfully achieve an in-depth appreciation of the local life-worlds, and finally portray events 'as the natives find them'. In their perceptions, power came only from the top down, rather than operating in diverse social spaces. There was a tendency to portray local people as homogeneous, assume communication as unproblematic and overstate the practicability of everything that is 'local'. The opposition between us and them and here and there was taken as given; the main question was only how to establish mutual communication between the conceptually separated knowledge systems. All this meant little problematization of people's positions in the production of knowledge differences and little recognition of the political context in which alternative knowledges were being promoted.

Both of the above presented perspectives thus rely on the categorical alienation of local knowledge from universal knowledge. In scientific reductionism, local knowledge is seen as a resource of information to be interpreted by scientists; in the alternative 'noble savage' vision it is considered as a panacea for emancipation, without any notion that there is a danger of appropriating the vision of the less powerful while claiming to see from their positions (Haraway, 1996). In both cases, local knowledge is portrayed as essentially non-rational – either because of its pre-scientific and backward character, or because of its primordial wisdom. These two apparently opposed approaches then have a common structure of sustaining the discourse of otherness, in which local knowledge serves as a mirror image of scientific knowledge and local people are left without agency and reason. Both cases demonstrate that the representations are inevitably political, consequently a critical analysis of local knowledges requires more attention to be paid to the relationship of diverse knowledges and to those power structures affecting the dominance of particular knowledges.

Situated knowledges

Processes of contestation and reinterpretation

When trying to analyse the relationship of expert knowledges and local knowledges in the forest-edge communities of Río San Juan, any conception of local insights as objectively knowable phenomena occupying discrete spaces became implausible. In these communities of colonization, where contradictory discourses overlapped and discrepant meanings criss-crossed, all knowledges were made up of diverse elements and combined within a world of multiple actors. Any attempt to draw sharp boundaries around what counted and what did not count as 'authentic' local knowledge proved to be fruitless; rather, there was a need to start to grapple with heterogeneous and hybrid knowledges.[13]

It is in these 'places of unpredictability' that we must begin to reformulate our anthropological paradigms. The characterizations of local knowledges as internally uncontested systems arising from a communal commitment to consensus (Browder, 1995; Heyd, 1995) simply did not hold true in these communities composed of diverse social actors – peasant smallholders, land speculators, squatters, forest extractors, ambulatory traders, timber dealers and healers – with their politically fragmented and socially differentiated knowledges. These knowledges carried with them responsibilities and rights that applied differentially according to the social position, as well as complex hierarchies for determining the power to narrate history, to define tradition, and to make claims to knowledge and authority. Although most of the inhabitants were 'rural cultivators', they also worked as itinerant peons, forest extractors and loggers, moving wherever economic opportunities seemed available to them. The occupational and sectoral boundaries were thus fluid and blurred, resulting in complicated hierarchies. The communities were politically fragmented into Sandinistas versus Liberals (or ex-Sandinistas versus ex-Contras) and religiously into Catholics versus Protestants. When conversing with local people it was thus necessary to carefully consider which metaphors to use in each situation: for many Sandinistas the term 'cooperative' brought to mind the epoch when they were given all the necessities free of charge, while most of the Liberals associated the term with directed development with no possibilities for independent action.

These colonist settlers' knowledges were, therefore, caught up in a rivalry of tendencies, fractured by class, age, religious, political and gender differences. Strategic differences in the environmental knowledge of men and women could be noted, depending upon the type of activity, resource and location. The knowledge of timber products was considered a speciality of men, because of the perception of the forest as a dangerous place that remains outside the range of women's activities. The knowledge of cattle husbandry was also assigned to men because they, as heads of the household, owned the cattle; women's knowledge of cattle husbandry was

confined to milking, the task which was stereotyped as an ideal activity for women because of their 'natural handiness'. Housework, including poultry raising, was considered a women's duty, while the women's special prestige was associated with their gendered knowledge of domestic healing. From early childhood, girls were socialized to make *tortillas*, wash clothes, sweep the ground floor, tend chickens and fetch water from the river, while boys were taught to 'flutter' the *machete*, ride a mule, carry sacks and defend themselves physically. All this demonstrates the uneven distribution of local knowledge and how it links to people's power relations and gendered access to resources.

Even in the knowledge repertoire among the local healers, significant variation could be remarked as a result of such factors as age, gender, kinship, religion and personal experience. Different healers used different methods and there was great competition between healers, midwives and 'magicians' on the 'true' interpretation of illnesses. Each specialist guarded his/her own knowledge as a secret property, which would lose its power or be transformed into harmful sorcery if it became known to other healing specialists. Local knowledge existed in diverse versions which were not separable from the people's competitive roles and historically situated practices.

The knowledges of these migrant peasants were also closely linked to their complex social history, composed of dynamic articulations between various knowledge systems. Their agricultural knowledge included practices of traditional slash-and-burn agriculture mixed with modern agribusiness, pre-Columbian metaphors of the earth as a symbol of life mixed with postcolonial resistance to Western images of local people's affinity with nature, traditional concepts of soils as hot and cold, mixed with modern insights of soil mineralogy. Don Sefarino had constructed his healing practices from heterogeneous matrices: from his uncle who was an excellent healer, from the Catholic monks in Chontales, from the indigenous herbalists in the Atlantic Coast, when assisting in a rural health project financed by USAID, in the training courses organized by the Ministry of Health, when serving as a guide for foreign ethnopharmacologists and bioscientists, and when practising as a healer in the local communities. His medicinal knowledge consisted of a complex repertoire of native herbs and vines, cultivated medicinal plants and 'modern' medicine, with their discrepant epistemologies.

To point out this character of knowledge production as a process, local people themselves used the term *conocer* (to be acquainted with), instead of *saber* (knowing). When asked about their knowledge of non-timber forest products or cures for snakebite, the typical answer was: 'I'm acquainted with some of that, but not so much.' People reworked their knowledges in response to changing social and political contexts that were products of local and non-local processes. Concerning this, their knowledges could not be defined as purely utilitarian and as 'conforming more closely to description

than to the powerful deductive explanations provided by science' (Clark and Murdoch, 1997: 43). These peasant colonists also innovated insights and identified goals; they analysed their actions, and created epistemologies. Their environmental knowledge in regard to the forest could not be seen as simple knowledge about useful forest products. It also included symbolic constructions of the forest as an uncultured space, something intact and wild that remained beyond human control. It was a source of unpredictable rains, thunder and storms, as well as a place of malevolent supernatural beings attacking lonely travellers. Behind the local conceptions of hot and cold, there was a whole epistemology of various oppositional forces that should be in proper relationship with each other to make the cosmic order possible. The systems of utilization and the systems of signification were, thus, intrinsically interwoven in these colonists' knowledge systems.

People also engaged in critical thinking and so attempted to change the conditions of their living in the political economy, where the complicated relations of knowledge and power produced hierarchical patterns of resource control. They criticized the power of developers to determine what pattern of resource utilization is good for them at the same time that they challenged the authority of *caciques*, as traditional powerholders, to control all the local resources. They questioned the principles of traditional medicine by deliberating whether getting wet in the afternoon when your body is 'hot' has anything to do with falling ill with rheumatism, at the same time as they deconstructed the omniscience of modern medicine by remarking that 'the doctors in the cities have no consciousness of hot and cold illnesses'. They declared that they do not believe in evil eye, although afterwards they told you many stories of persons who had lost their luck due to the sorcery of envious neighbours. They criticized local healers as 'impostors who live at the expense of the credulous', even while attending them regularly. By this kind of bargaining and critical deliberation people tried to rework their knowledges to fit ever-changing situations.[14]

In this light, the entire dichotomization of traditional knowledge as inherently opposed to modern (or postmodern) knowledge seemed arbitrary. Only by examining the continuity in change, traditionality in modernity, and situationality in hybridity could a more profound significance involved in the reconstruction of local knowledge be revealed. There was no monolithic modernity expanding, inexorably, into this jungle; rather, local and global were intrinsically mingled together, and ambivalent meanings created complicated local life-worlds.

Struggles over knowledge and representation

From this perspective of situated knowledges, it became evident that also in the game between 'experts' and 'clients', the local settlers were actors constructing the other. They contested the symbolic subjugation of their knowledges by critically challenging the developers' expertise as 'some loose tips' (instructions, pieces of advice), changing chaotically according

to the vicissitudes of development policies. They also questioned the progressive character of science by pointing out that in the cycle of different booms the developers' 'big promises' are never fulfilled. In regard to the current boom of 'natural products' and 'local environmental wisdom' they even felt that the developers were making them ridiculous. When the physicians only a decade ago condemned their use of wild plants as medicines, scientists now come to ask them to serve as guides to the reserve of Indio-Maíz in search for natural remedies. A local extractor, Don Ernesto, could not but laugh at the whole circus; he told amusingly how 'some *cheles*[15] are going to implement a project of rattan as an alternative non-timber forest product in the community of Buena Vista, although there is almost no rattan left in this region. And all this just because the experts have now realized that the tropical forests are more than timber.' By this story, Don Ernesto wanted to call attention to the ignorance of the developers who had no notion of the wider social and political context in which the 'utility' of local resources and local knowledges is continuously defined.

In this game of reconstruction, local people no longer identified themselves as authentic others, but as people who have for ages been mediated by globalization. The inevitable influence of modernization was recognized, as well as the existence of the 'new world', where their knowledges are characterized by alterity and hybridity. They were well aware that the intransigent dependency upon 'traditional' knowledge is a less efficient strategy to cope with globalization than a critical opening toward the present, including a selective engagement with current discourses of development. They clearly recognized that in a situation where bioprospectors define the value of their medicinal plants and rural advisers determine the reasonableness of their agricultural knowledge, any change in the current violence against the subject of knowledges requires struggle at different levels, from local to global.

In this regard, local settlers proved to be very clever in using the current phraseology of sustainability. When conversing with development experts, they carefully employed the clichés of environmental consciousness, local participation, and sound resource utilization. This confusing imitation of all the rhetoric of sustainability was a key to the reconstitution and redeployment of their knowledges. One of my key informants, Don Rufino, was well aware of the images salient in international environmental and development circles. He emphasized the value of the biological reserve of Indio-Maíz as the world's largest and last 'pharmacy', urging that it has to be studied by scientists before it vanishes. However, when talking with his neighbours, he merely wondered why the government did not give this 'reserve of idle land' to poor peasants who do not have a place where they can survive. He proudly told me about the native multi-purpose species, providing the necessary details to satisfy a foreign anthropologist interested in ethnoecology. He showed me the tree called *hombre grande* as an indispensable remedy against malaria, and the vine called *uña de gato* as the most

promising cure against cancer, AIDS, and other 'modern' illnesses. When he himself felt any symptoms of malaria, however, he went to the nearest health centre to ask for malaria pills.

All this shows that these colonists were well aware of what anthropologists and environmentalists wanted them to do: go back to nature and live in thatched huts instead of concrete houses, preserve their traditional healing practices instead of using modern medicine, and conserve their forests for future generations instead of clearing them for agriculture. They were well acquainted with the expectations placed upon them by those who occupied high positions in regional, national and international development politics. In this situation, they reshaped their knowledges in order to fit better with the image of 'sound resource users', seen as a prerequisite for receiving benefits from the donors. At the same time, they eagerly stressed the systematic character of their knowledges, while disguising any aspect that could be associated with magic or primitivism. This was because they did not want to be confused with the 'savage Indians', whose knowledges they perceived as threatening witchcraft. When talking about their conception of the moon regulating the vitality of life, they carefully remarked that 'many scientists have been interested in the rationality of our practice of rooting up tubers in the waning moon'. They were strategically negotiating which aspects to emphasize or conceal in their knowledge repertoires, at the same time as they were reinterpreting the multiple meanings of sustainability.

All this challenges the alternative developmentalists' view that if both sides in the development process improve their communication, a major obstacle for development will be removed. Such a vision ignored the many reasons people may have for not wishing to communicate (Hobart, 1993: 11–12). In our daily conversations, people always insisted that they had no idea of the development projects going on in their communities, even those persons who regularly attended the projects' village meetings. By this rejection people wanted to imply that the developers are not trying to resolve their problems. Their reluctance to participate was not simply an indication of their passivity; it was also a strategic form of resistance against those planning for their future.

People also contested the role of clients thrust upon them by developers. When conversing with rural advisers they appreciated the improvements of their production systems by developers' expertise. In their heart of hearts, however, they felt a deep resentment towards any discourse of development. They themselves called this *hacer la guatuza* – 'leaving a stranger in the lurch' – or as explained by Doña Ernestina: 'if you are a *chela* and you come here, people swear to you that they will participate and that everything is possible, and then they knife you in the back'. When a project implementing a campaign of agricultural diversification supplied pineapples to local settlers to be planted in their home gardens, people took dozens of pineapples, but instead of planting them, they either ate them or

sold them in nearby communities. This was their way of criticizing the developers' ignorance of the vulnerability of local economy in relation to far-reaching global markets. All this demonstrates how people understand and misunderstand in strategic ways and how their knowledges are redefined in compliance, negotiation and resistance within the wider discourses of development and power.

The critical task of anthropology in this work of reconstruction is to search for fresh forms of knowledge and representation that identify difference without domination and diversity without totalization. Theoretically, this requires a new epistemological basis that recognizes the fluidity of boundaries and the partiality of entities, while emphasizing the multiplicity of voices and the diversity of visions. This struggle for a vision of contextualized knowledges is not just intellectual or 'academic', it also has enormous consequences for people's lives, for knowledge making and for political action, as can be noted when simply reflecting on the power that science, such as engineering, biotechnology and medicine, has today over people's bodies and life-worlds (Fujimura, 1997).

Conclusion

This study took a critical look at the conventional approaches categorizing local knowledge as opposed to universal knowledge. The epistemology of scientific rationalism, perceiving local knowledge as scapegoat for backwardness or as a raw material for scientists, was challenged. The alternative 'noble savage' approach, in which local knowledge is portrayed as holistic wisdom, was likewise deconstructed. The study emphasized the necessity of analysing local knowledges as heterogeneous ways of knowing that emerge out of a multidimensional reality in which diverse cultural, environmental, economic and socio-political factors intersect. All knowledges are derived from the interaction of multiple social actors, that are differentially empowered and move in a terrain characterized by contradictory, competitive and complementary relations.

All this makes it impossible to work with sharp boundaries between people's science and scientists' science. Local knowledge repertoires are a result of knowledge encounters in which local and global, and traditional and modern are intricately intermingled. A critical question is rather the relative status of the different components in these knowledge encounters. Would we expect to see the gradual marginalization of alternative knowledges, or can there be a symmetrical coexistence between these diverse forms of knowledge?

According to Turnbull (1991: 572), what is needed is 'to find ways to give a voice to local knowledges without smothering them in totalizing theories'. This requires spanning the all-encompassing divides and reorienting ourselves toward situated knowledges. Such a perspective offers

interesting angles from which to analyse the existing heterogeneity of knowledges and the multiple ways by which the local knowledge systems become linked to global representations of knowledge and power. In today's highly interconnected world, local people find themselves tied into social, scientific and technical networks which extend far beyond their locality and, consequently, there is an increasing need to recognize the ongoing hybridization of their knowledges.

A strategy to empower local knowledges requires an understanding not only of the hegemonic discourses authorizing essentialist representations of knowledges, but also of the shifting and contested nature of local knowledges, which are themselves derived from discrepant epistemologies and practices. For us as anthropologists, this means we are called upon to pay greater heed to the interpretations of the people we study. It also demands that we welcome these alternative ways of conceptualization which now have no voice or which simply are not heard in contemporary scientific and developmentalist discourses. This at best offers us a much better understanding of marginalized people's struggles to reconfigure their knowledges and to reconstruct their life with meaning in today's networks of knowledge and power.

Notes

1 The terms 'local knowledge', 'indigenous knowledge', 'traditional knowledge' and 'ethnoscience' are used as synonyms here, although each has its drawbacks. 'Ethnoscience' has a competing meaning in linguistic anthropology, where it is limited to semantic analysis of folk taxonomies. 'Local knowledge' has a connotation that local people are only observing their immediate surroundings and that their knowledge has no wider application. 'Traditional knowledge' connotes a homogeneous system of thought, thus obscuring the fact that people everywhere constantly rework their knowledges. 'Indigenous knowledge' conceals the fact that all people, irrespective of whether they are indigenous to a given area, have developed complicated understandings of the world (De Walt, 1994; Sillitoe, 1998). A thorough semantic analysis of these terms is beyond the scope of this article.

2 The anthropological field research was carried out in Río San Juan in 1996–8. The primary information consists of tape-recorded interviews, informal meetings, daily conversations and participant observations involving local people, as well as numerous state agents, development experts, and environmental and social movement activists in 45 development institutions and

NGOs. Except where explicitly stated, the presented information is based on my field material.

3　Two-thirds of the land in the department of Río San Juan belonged to the dictator Somoza and absentee land speculators. Most of these 'unoccupied' lands were nationalized during the Sandinista government (Rabella, 1995: 101–5).

4　Interestingly, only a day before, this rural adviser eagerly told me how he had participated in various courses of local empowerment.

5　For those criticizing the categorical distinction of us as knowers and them as to be known see Fabian (1990), Hobart (1996), Latour (1993) and Law and Whittaker (1988). For studies analysing the subjugation of local knowledges by a hegemonic discourse of expert knowledge see Escobar (1997), Hobart (1993) and Pigg (1996).

6　These metaphors of 'hot' and 'cold' form a network of meanings in everyday knowledge throughout Central America. They refer to plants, soils, bodily conditions, foods, illnesses and medicines. In this knowledge system, hot and cold are not transitory states of thermal quantities, but intrinsic qualities of each object; for example water considered as a cold element remains cold even when boiling. This classification system is a modified form of an ancient Greek humour pathology transmitted through Spain to the New World, where it combined with Mesoamerican traditions (Wilken, 1990). It is a dynamic system of classification in which people selectively mix diverse meanings together.

7　For recent studies, emphasizing the role of anthropology as one of promoting the potential contribution of indigenous knowledges to sustainable development see Forsyth (1996), Purcell (1998), Sillitoe (1998) and Warren et al. (1995).

8　This applies also to the famous *Agenda 21*. This global environmental strategy recognizes that indigenous peoples 'have developed over many generations a holistic traditional scientific knowledge of their lands, natural resources and environment', and then recommends the 'recognition of their values, traditional knowledge and resource management practices with a view to promoting environmentally sound and sustainable development' (UNCED, 1993: 227–8). According to the criticism expressed by many Third World experts, despite all the rhetoric on 'local knowledge', this environmental strategy appreciates the scientific knowledge of the West, and secures the political interests of the North, giving no space for alternative ways of making politics and representing knowledges. For more on this criticism, see Benton (1994) and Guha and Martínez-Allier (1997).

9　For detailed analyses of local knowledge and intellectual property rights concerning bioprospecting see Brush (1993), Brush and Stabinsky (1996) and Cleveland and Murray (1997).

10　For ethnographic laboratory studies that demonstrate how science attempts to decontextualize itself in order to make itself neutral see Knorr-Cetina (1995), Latour (1993), Shapin (1995) and Watson-Verran and Turnbull (1995). Such social studies of science have been criticized by Gross and Levitt (1994) and Sokal (1996), according to whom any argument about science as social practice is absurd and antiscientific. According to them, science as objective and systematic offers the best available methods for producing credible claims. For more on this epistemological controversy see Fujimura (1998) and Ross (1996).

11　The 'primitive environmental wisdom' continues to be an issue which provokes heated discussion in anthropology and the social sciences. For those proposing

the superiority of non-Western knowledges because they represent a close affinity with nature see Hoffman (1997), Merchant (1992), Shiva (1989) and Warren (1990). For those criticizing the essentialist representation of non-Western peoples as 'nature conservationists' see Agrawal (1995), Bebbington (1993), Buege (1996), Colchester (1997), Guha and Martínez-Allier (1997), Headland (1997) and Milton (1996: 106–41).

12 For inspiring studies on representations of indigenous and non-indigenous people in the global imageries see Conklin and Graham (1995), Lutz and Collins (1993), Nugent (1993, 1997) and Ramos (1991).

13 For studies dismantling the dichotomies of local and global see Agrawal (1995), Descola and Pálsson (1996), Haraway (1996), Moore (1996), Murdoch and Clark (1994) and Nader (1996). For studies on reconstruction and hybridization see Clark and Murdoch (1997), Gupta and Ferguson (1992), Jackson (1995) and Mitchell (1997).

14 In this respect, see the inspiring study by Pigg (1996) on the shifting character of 'traditional' belief systems in Nepal.

15 A pejorative appellation, referring to a person who is light-complexioned and foreign (North American or European).

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Ecological Anthropology

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INTRODUCTION

Ecological anthropology may be defined as the study of the relations among the population dynamics, social organization, and culture of human populations and the environments in which they live. It includes comparative research as well as analyses of specific populations from both synchronic and diachronic perspectives. In many cases, systems of production constitute important links among population dynamics, social organization, culture, and environment. Defined as such, ecological anthropology provides a materialist examination of the range of human activity and thus bears an affinity to other materialistic approaches in the social and biological sciences.

Review articles can be critical or encyclopedic; this one adopts the former approach. It presents the development of ecological anthropology, not as a smooth accumulation of information and insights, but as a series of stages. Each stage is a reaction to the previous one rather than merely an addition to it. The first stage is characterized by the work of Julian Steward and Leslie White, the second is termed neofunctionalism and neoevolutionism, and the third one is called processual ecological anthropology. In all three cases, this article discusses the theoretical assumptions and methodological approaches, and examines a few representative studies. It reviews the links to biological ecology and analyzes the mechanisms of change. It is in these areas that processual ecological anthropology is particularly strong. It thus adopts a more historical approach than the positivist slant of recent texts in the field (123, 194, 205).

This article focuses primarily on work in social anthropology. It contains relatively little archaeology. The treatment of demography is brief; for other studies of demographic anthropology, see (181, 229, 340). The primary focus is on social, economic, and political activity and ideology; there is only brief treatment of what has been termed "biosocial ecology" (321). The relation between environments and human physiology, nutrition, disease and the like, though part of human ecology, is not discussed in this article, although some work (166a, 236, 249) in ecological anthropology examines these topics.

THE FIRST STAGE OF ECOLOGICAL ANTHROPOLOGY: JULIAN STEWARD AND LESLIE WHITE

Ecological anthropology owes its existence to a number of swings on intellectual pendulums. Stated briefly, it emerged from the reaction to the incautious cultural evolutionism associated with Morgan, Tylor, and others in the nineteenth century. In this period, a number of writers developed models of cultural evolution. The specific details of the models and some aspects of the conceptualization of culture varied, but the writers shared the assumption that all cultures could be placed in a small number of stages and that cultures tended to move through these stages in a relatively fixed sequence. Morgan, one important figure in this school, established a set of seven evolutionary stages which Marx and Engels encountered and utilized.

The cultural evolutionistic approaches were overcome by the data which they attempted to order; the reaction to them led to the institutionalization of anthropology as an academic discipline. The increasingly detailed evidence of complex culture and social organization among allegedly primitive groups made it difficult to relegate them to more backward, earlier stages. The reaction to cultural evolutionism took different forms on opposite sides of the Atlantic and thus broke a relatively high degree of intellectual consensus. Anthropologists in America, led by Boas at Columbia University, questioned the unilinearity of the evolutionary schemes and the assumption of progress inherent in evolution. They accepted the interest in cultural process and change, but looked more prudently for details of each case of culture change, examining whether traits were diffused or independently invented and how they were reworked by each culture that adopted them. The school that they formed has been aptly named historical particularism. The British anthropologists faced a different issue which the cultural evolutionists had not resolved, the nature of the forces that united the different elements of a given culture or stage of cultures. Focusing on societies rather than cultures, they found that the diverse elements served certain functions,

although different authors did not agree on the nature of these functions. They also observed that the elements formed coherent structures. The influence of British social anthropology, itself changed somewhat over the decades, has begun to be felt in ecological anthropology only recently (36a); the history of ecological anthropology for many years remained primarily American.

Ecological anthropology emerged from the Boasian school of historical particularism (136, 223). It can be seen as having passed through two stages and now entering a third. The term "stage" is used to refer to a set of works that share theoretical approaches, modes of explanation, and choices of research problems. The term also suggests that the stages follow one another chronologically and that each is an intellectual outgrowth of the one that preceded it. The first stage ran from about 1930 to 1960, and the second from about 1960 to the early 1970s. These dates cannot be exact, since many writers continue to employ earlier approaches after new ones have been introduced. In addition, some researchers have shifted from one stage to the next, but others have remained with the previous ones. The stages thus refer to analytical frameworks rather than to specific periods in time or the writings of specific individuals.

As an intellectual endeavor, contemporary ecological anthropology can be clearly attributed to two individuals: Julian Steward and Leslie White. These men shared a strong Boasian training; Steward at Berkeley and White at Chicago were both taught by students of Boas, who had founded these departments (Alfred Kroeber and Robert Lowie, Fay Cooper Cole and Edward Sapir, respectively.) It is an apparent paradox that Steward, who received more contact with individuals outside this Boasian circle in his graduate student days, made the less definitive break with historical particularism.

Steward's work in ecological anthropology was motivated by a consistent set of intellectual concerns (177). His contact at Berkeley with the noted geographer Carl Sauer led him to examine the effect of environment on culture. This interest characterizes his early postdoctoral work in the Great Basin and his later more comparative work elsewhere. (Sauer also influenced Daryll Forde, one of the more ecologically oriented British social anthropologists.) His "method of cultural ecology" (292, 294) demonstrates his materialist emphasis. This method entails the study of the relation between certain features of the environment and certain traits of the culture possessed by the sets of people living in that environment. Within the environment, Steward emphasized the quality, quantity, and distribution of resources. The aspects of culture that he examined most closely were technology, economic arrangements, social organization, and demography, although he included other aspects as well. Steward stressed the fact that the

environment influenced only certain elements of a culture, which he termed the "culture core"; other elements of culture were subject to the autonomous processes of culture history which the more strict Boasians discussed. Steward was particularly interested in finding what he termed "regularities," or similarities between cultures that recur in historically separate or distinct areas or traditions, and which may be explained as a result of similar environmental features. These regularities are analytically similar to the individual lines of change which he examined in his approach of multilinear evolution. By introducing the concept of "level of sociocultural integration," he began efforts to integrate the study of small-scale "tribal" isolates with that of complex society and large sociopolitical units.

His method permitted both synchronic analyses of static equilibria and diachronic analyses of both long-term and short-term evolutionary processes (196). His early (289) work on prehistoric societies of the American Southwest demonstrates his interest in a specific area. His later evolutionary work was more ambitious and comparative; a change may be noted (40) in the shifts from the ambiguous categorizations of the *Handbook of South American Indians* (291) to the strongly evolutionist analysis of irrigation civilizations (290) to the later, more cautious works such as the controlled comparison of two Indian groups in North and South America (197) and a general review of cultural evolution (293, 295).

Leslie White's relation to the Boasian tradition was somewhat different. Like Steward, he wrote a historical particularist dissertation, but he made a sharp break with that approach soon after. He taught at Buffalo, where he visited the Iroquois and read Morgan's work. A trip to the Soviet Union in 1929 impressed him with Marxism, and he found that the works of those two figures were closely associated. He became virtually obsessed with the extreme rejection of cultural evolutionism that was current then, and dedicated much of his intellectual career to efforts to restore it to respectability within anthropology.

White shared Steward's emphasis on culture as the unit of analysis and his interest in cultural evolution; his partitioning of culture into technological, social, and ideological components gave him a materialist stance generally similar to Steward's. White was more concerned with the broad details of evolution than with specific adaptations, however, and he also directed relatively little attention to the influence of environment on particular cultures. Instead he emphasized levels of energy use as the determinant of cultural evolution (328), a point which has continued to hold importance for anthropology (2a). Although his proposed science of culturology never achieved the fame that he had hoped for, his stress on the consistency of cultural evolution has had a broad influence.

Despite their similarities, there were several fundamental differences between these two founders of ecological anthropology. White was unwilling to admit the utility of other theoretical frameworks, but Steward specifically designated the areas where other approaches, such as historical particularism, could complement his own work. In both synchronic and diachronic studies, White was much less interested in adaptation of groups to specific environments than Steward was. Finally, although the distinction is not as rigid as some critics have made it out to be, White's models of cultural evolution were unilinear and monocausal, whereas Steward admitted a number of different lines of cultural development and a number of different causal factors. These differences posed a problem that was simultaneously intellectual and sociological; not only did many anthropologists wish to resolve the theoretical disagreements between the two, but they sought to avoid factionalism in specific institutional settings such as academic departments.

THE SECOND STAGE OF ECOLOGICAL ANTHROPOLOGY: NEOEVOLUTIONISM AND NEOFUNCTIONALISM

The attempts to address the similarities and differences of Steward and White mark the second stage of ecological anthropology. Boldly oversimplifying, one could argue that there are two main trends in this second stage: the neoevolutionists, who claimed that Steward and White were both correct, and the neofunctionalists, who argued that they were both wrong.

Neoevolutionism

The neoevolutionists, drawing inspiration from the centennial of Darwin's publication, *The Origin of Species*, established a series of evolutionary stages and used the notions of specific and general evolution (266a) to accommodate Steward's method of cultural ecology to White's work on unilineal evolution. The term neoevolutionism serves to distinguish their writings from those of earlier evolutionists such as Tylor and Morgan. General evolution, which tends to be unilinear, included features from Steward's work (level of integration) as well as from White's (energy use per capita per year). Elman Service (276), for example, dedicated his *Primitive Social Organization: An Evolutionary Approach* to Steward and White. General evolution strongly resembles the long discarded view in biology that evolution is progressive and leads toward new and better forms in succeeding periods. Much of this work has involved the establishment of a small number of evolutionary stages. These formulations also show the influence

of Polanyi's (230) notion of three types of economies, based on reciprocity, redistribution, and market exchange. Some work examines cases of apparent cultural regression or movement from a higher to a lower stage of cultural evolution. The debate (19, 46, 118, 173) on the ability of the humid tropical forest to support large complex societies reflects this discussion. By marking out cases of regression as exceptional, it serves to reinforce the general orthogenetic tone of neoevolutionism. The more multilinear specific evolution relies closely on Steward's writings. Adopting techniques from general systems theory, archaeologists and social anthropologists in the neoevolutionist school have collaborated in the study of the origins of agriculture and the emergence of the state. In the latter, for example, there has been considerable debate on several topics: whether the existence of social stratification preceded or followed the origins of the state (101, 207), the analytical power of certain causal theories of state formation (39, 277), the universality of patterns of pristine state formation (278), and the utility of the distinction between pristine or primary and secondary states (338). Several review articles on this subject have appeared recently (95, 144, 336).

Neofunctionalism

The neofunctionalist school represents a second line of resolution of Steward and White. It is associated with Marvin Harris and the early work of Andrew Vayda and Roy Rappaport; like the first line of resolution, it was concentrated for a number of years at Columbia and Michigan universities. The term neofunctionalism is used because the followers of this approach see the social organization and culture of specific populations as functional adaptations which permit the populations to exploit their environments successfully without exceeding their carrying capacity. This approach differs from other functionalist approaches in the social sciences in that the unit which is maintained is a population rather than a social order. It also differs from the treatment of adaptation in biological ecology by treating populations rather than individuals as the units which adapt to environments. It forms a school, although there are differences between individuals in it (Harris's greater concern with causality, Vayda and Rappaport's with system functioning), and some members have shifted their theoretical position in recent years.

In general, neofunctionalists explain specific aspects of social organization and culture in terms of the functions which they serve in adapting local populations to their environments. A close parallel might be noted between White's technological, social, and ideological components of culture and Harris's division of sociocultural adaptations into ecological patterns (including technoenvironmental and demographic aspects), social structure,

and ideology (129), which reappear, in slightly modified form, as infrastructure, structure, and superstructure (131), with a strong similarity evident to the Marxist concept of mode of production and its components of forces of production, relations of production, and superstructure. However, it would be more accurate to agree with the members of the neofunctionalist school and dwell on the sharp discontinuity between their work and that of Steward and White instead of the similarities. They adopt local populations rather than cultures as their units of analysis. They examine the interaction between environments and populations rather than treating the environment as a passive background which shapes culture but is not influenced by it, and their methodology is more explicit, rigorous, and quantitative than that of earlier writers. They are concerned to adopt concepts from biological ecology, although they often use these concepts in a naive or outdated fashion because of the weak historical, institutional, and interpersonal links between anthropology and biological ecology. Specific terms which were borrowed include adaptation, niche, and carrying capacity (11, 121, 122, 183, 243, 339), although there were numerous problems with all three cases (35, 137, 175, 182, 216, 296). [For more thoughtful treatment of the concept of adaptation, see Alland (4) and Vayda (310); there are also a few cases (106, 175) of appropriate use of the niche concept.] Their uncritical use of Wynne-Edwards' notions of group selection is another example of this problematic borrowing; examples (205) of the uncritical use of this concept can be found more than 10 years after a devastating attack on it had been published (331). Like the neoevolutionists, this school is influenced by systems theory, both generally, in its choice of homeostatic equilibrium models, and specifically, in its concern with energy flow in ecosystems (72).

Neoevolutionism and Neofunctionalism Compared

The neofunctionalist and neoevolutionist schools tend to follow certain trends within biological ecology. They focus on regularities in ecosystem-level process. In this approach, human populations are believed to function within ecosystems as other populations do, and the interaction of different human populations is like the interaction of different species within ecosystems (313). This approach leads to an emphasis (237) on energy and nutrient cycling. They also adopt a view of ecosystems as relatively tightly integrated, and they accept a series of concepts that are associated with the notion of "succession," or the orderly and regular replacement of species in a disturbed ecosystem over time as it goes from a "pioneer" to a "climax" stage. More "mature" ecosystems are supposed to be more complex, diverse, stable, and efficient. [Rappaport's (236) comparison between Tsem-

baga society and Polynesian kingdoms, for example, follows this view.] It is not surprising that several of the most frequently cited ecology texts are the different editions of E.P. Odum's *Fundamentals of Ecology* (209).

The neofunctionalists and neoevolutionists have examined the mechanisms which link social structure and culture to the environment. They follow biological ecologists in emphasizing survival and reproduction as the goals of organisms (165), and they therefore emphasize population pressure as one of the principal mechanisms of change (124). Unlike biologists, they do not have a principle like natural selection which generates these goals, and instead tend to fall back on implicit and poorly operationalized concepts of adaptation. Systems should tend toward homeostatic equilibrium (238, 239), with populations at or close to carrying capacity; population growth above these limits induces change. The carrying capacity reflects environmental variables and technology, and may be influenced by the presence of other neighboring groups of trade partners, political enemies, and the like. Population pressure, however, does not translate immediately into human motivation, and some ecological anthropologists, seeking to explain change, have had to appeal rather generally to notions of human desires for survival or to the gradual replacement of less efficient systems of production by more efficient ones (5). In a more recent discussion, Harris (131) lists the desires for food, sex, and love and affection and a tendency toward the expenditure of the minimum amount of effort necessary as universal human constraints from which social and cultural systems can be built, although this recapitulation of Malinowski is difficult to use in concrete cases. Values and preferences are explained by being reduced to the ecological functions they serve, as in treatments of factors which influence the levels of effort and efficiency of tropical forest hunters (249, 281) or in the female infanticide-male warfare complex (70, 145, 200). This lack of an ability to account for motivation and values in a more direct way has attracted a great deal of criticism, and may account in part for the rift between ecological anthropologists and their opponents (24). Such a lack, however, has been addressed in the third stage of ecological anthropology, as will be discussed later.

The neoevolutionists and neofunctionalists, although they examine populations of different sizes in different time scales, share a great deal. They accepted the issues which Steward and White had outlined as worthy of investigation, although they took different approaches in their study. They both added a strong systems orientation to an earlier materialism, although the neofunctionalists emphasized negative feedback mechanisms linking energy use, food production, and population size, and the neoevolutionists stressed positive feedback mechanisms among the same variables. They developed strong interpersonal and institutional links; the departments at

Columbia and Michigan universities had representatives of both for many years. Some individuals work in both approaches. Furthermore, the concern of the neoevolutionists to define stages (141) in general cultural evolution (e.g. "bands," "tribes") dovetails with the efforts of the neofunctionalists to establish basic production types (e.g. "hunting and gathering," "swidden agriculture"); in some cases, as in the ones listed, evolutionary stages and production types can be correlated (63, 73, 287).

Early neofunctionalist analysis (228, 297) of the Northwest Coast groups showed that the apparently exotic custom of the potlatch served adaptive functions by encouraging the redistribution of food from groups with a temporary surplus to those with a temporary deficit. Part of the appeal of this analysis (71, 162, 211) derived from the ability to challenge Boas on his own ground, since the cultures of that area were among the ones he studied most intensively. In addition, it began a tendency, still quite strong, within neofunctional ecological anthropology, to define one of its tasks as the explication of ethnographic riddles (130). In this line of work, an ecological anthropologist picks a custom or practice which would seem to demonstrate the extreme intercultural variability of human behavior and the lack of fit between culture and environment; the supposedly impractical cultural elements are shown to possess positive adaptive value. The second such riddle was the sacred cattle of India (127, 128, 208). Other examples have appeared, the most currently famous of which is Aztec cannibalism and its purported nutritional significance (125, 222, 231: see also 143, 253). The adoption of riddle explication as a goal would seem to be justified by the following logic: if apparently impractical behavior can be explained on ecological grounds, then less impractical behavior must surely also be explicable in the same manner. Although the discussion of such riddles has attracted a fair amount of attention within strictly anthropological circles and others as well (134), it has often not led to a more thorough attempt to explain the less bizarre behavior that makes up much of the subject matter of ecological anthropology (6). Instead it has led to the proposal of alternative solutions to the riddles (67–69) with little possibility of empirically testing them.

The neofunctionalist school has brought certain benefits, particularly the generation of detailed descriptions of food-producing systems (5, 153, 199, 256), a greater concern for recording environmental and demographic data (200), the suggestion of the systematic nature of the interactions between the environment on the one hand and social organization and culture on the other, and the demonstration of certain weak points in the work of Steward and White. There are several problems which have emerged from it, some of which also apply to the neoevolutionists: (*a*) Functionalist fallacy. The neofunctionalists are simply incorrect in attempting to argue

that human populations remain at or below carrying capacity, since they miss the cases of populations which cause significant damage to their environments (178, 187). The idea of a relatively fixed carrying capacity has remained in the literature, despite the publication of strong critiques of it. Even when the damage is minimal or unmeasurable, they possess the frequently criticized flaws of functionalism: the inability to distinguish between functional alternatives, logical circularity, and false attribution of purposiveness (245). (b) Ecological reductionism. Many of the writers of this school tend to assume that particular aspects of social organization and culture serve specific functions in adapting local populations to their environment (242). They (99, 117, 138) thus tend to present social organization and culture as unstructured sets of practices and beliefs rather than as possessing internal coherence. Leeds's (167, 168) discussions of the Yaruro Indians in Venezuela are an exception to this common pattern. (c) Energetics. Energy need not be the limiting factor in restricting population growth or social complexity. Although biological ecologists have recognized this fact for many years, ecological anthropologists have became aware of it only recently (207, 311). These issues are interrelated; energy flow is a simple way to consider local populations in the context of ecosystems (283). Thomas's (301) discussion of energy flow in a highland Andean district, for instance, argues that energy is a limiting factor despite the fact that local people are involved in producing commodities for export whose prices on the world market shift greatly; government policies also strongly affect their access to factors of production. It is therefore difficult to argue that their adaptations are constrained primarily by local environmental factors or their access to energy. The presentation of arguments that energy is not limiting in many human populations has led to minor refinements in several cases: protein is substituted for calories as the limiting dietary factor or energy, though not limiting, is critical; by producing energy as efficiently as possible, time is conserved to address the scarcity or excess of other limiting factors, so that populations still must behave in much the same manner as if energy were limiting. This latter approach raises a common problem in ecological anthropology; writers claim that populations or individuals maximize several variables simultaneously, but they do not address the issues of trade-offs between the variables and choice between several optima (132). (d) The local population as unit of study. Local populations are difficult to bound (193) and tend to be involved in wider networks of social, economic, and political relations (275a). The nature of population-level processes is unclear, and there has been a neglect of both supralocal processes and internal differentiation (227, 260). [See, however, some works by Harris (131) and Vayda (309) which examine larger units.] (e) Time-scale. The assumptions about local populations being in homeostatic equi-

librium are difficult to assess because they require a long time scale. The work also tends to present a sharp disjuncture between synchronic equilibrium and long-term macroevolution corresponding to the separation between the neofunctionalists and the neoevolutionists. Mechanisms of short-term cultural evolution are also often lacking. [See, however, Leeds's (169) treatment of microinvention.]

THE THIRD STAGE OF ECOLOGICAL ANTHROPOLOGY: PROCESSUAL APPROACHES

In contrast to the work of Steward and White and the neoevolutionary and neofunctionalist schools, a third set of approaches in ecological anthropology has begun to emerge in recent years. The research that is being carried out cannot be characterized as strongly as in the two previous stages as sharing a large number of assumptions, but it does question the neofunctionalist approach along the lines indicated above. This work will be called "processual" ecological anthropology. The use of the term "process" has been used earlier by other writers (16, 158, 171, 186) to refer to the importance of diachronic studies in ecological anthropology and to the need to examine mechanisms of change. However, the term "processual ecological anthropology" to describe current developments in the field does appear to be new. Important trends are (a) the examination of the relation of demographic variables and production systems, stimulated in part by Boserup's work (31); (b) the response of populations to environmental stress (268, 311, 312); (c) the formation and consolidation of adaptive strategies (22–24, 27, 37, 38) which follow Barth's early work on the use of the concept of the niche (11); and (d) new work in Marxism, including the emerging interest of anthropologists in political economy and structural Marxism. The studies are called processual because they seek to overcome the split in the second stage of ecological anthropology between excessively short and long time scales (15, 84–86). More concretely, they examine shifts and changes in individual and group activities, and they focus on the mechanisms by which behavior and external constraints influence each other. These points indicate the importance of the incorporation of decision-making models into ecological anthropology. Like the neofunctionalist and neoevolutionist ecological anthropology, processual ecological anthropology examines the interaction of populations and environments (57) rather than treating the latter as a passive background to the former. There are strong parallels between processual ecological anthropology and current work in biological ecology; the nature of these resemblances is the subject of some analyses which seek to link anthropology and biology in a more rigorous manner than has previously been the case.

It should be noted that work characteristic of Steward in the two previous stages continues to the present. His method of cultural ecology, for instance, is exemplified in several studies (26, 303) including some of Netting's work among agriculturalists in Nigeria (201–203) and Switzerland (204); see also (197). Strong echoes of Steward's search for "regularities" can be noted in Wolf's *Peasant Wars of the Twentieth Century* (334) and elsewhere (116). Similarly, neofunctionalist studies are still being carried out. Bolton's (30) recent analysis of guinea pig production and consumption in one village in highland Peru, for instance, suggests that although guinea pigs contribute less than one-twentieth of the protein in the local diet, "the ritual cycle . . . serves to distribute protein, making it available at times when it will be maximally beneficial for the maintenance of health in the population" (p. 249) based on informants' statements on ritual guinea pig consumption, with little direct observation on diet, and simulation models rather than observation of guinea pig flock dynamics. Neoevolutionary work also continues to the present (53, 158, 174).

Actor-Based Models and Processual Ecological Anthropology

A major influence on the processual ecological anthropology is the actor-based models which have received general interest in social anthropology. The literature on these models is large and diverse; one particular focus, decision-making models, will be emphasized here. The actor-based models form part of a general shift in postwar anthropology in both Britain and the United States from social structure to social process, from treating populations as uniform to examining diversity and variability within them, and from normative and jural aspects to behavioral aspects of social relations. Firth's (92–94) distinction between social structure and social organization is a major point of departure. He underscored the importance of variability in decision making and individual behavior, and demonstrated that many social systems contain options among which individuals must choose.

The actor-based models have several advantages: they account for a wider range of social organization than previous models do; they permit a more precise analysis of the parameters of behavior and the variation of behavior within populations; they admit more readily an examination of conflict and competition; and they offer the potential of examining change through an analysis of the processes which generate economic, political, and social relations. One important aspect of actor-based models is decision-making models, which may be loosely divided into two types: cognitive or naturalistic models and microeconomic models. These types are not necessarily opposed, as attempts at synthesis (47a, 147) show; they remain, however, largely distinct. The former, borrowing from cognitive anthropology, attempt to depict actual psychological processes of decision

making by locating the cognized alternatives and the procedures for choosing among them. Quinn (234, p. 42) distinguishes within these among "information processing models," "retrodictive models," and "models of cultural principles." These types all tend to be employed to analyze contexts in which individuals must select among a small number of alternatives, often on the basis of consideration of social status. Postmarital residence and adoption are common topics. These models offer useful links between studies of native systems of classification and actual behavior; such ethnosemantic models have been developed for the planting decisions of Brazilian sharecroppers (154–156) and the marketing decisions of West African fish vendors (108). These models often are applied to situations in which alternatives are finite and may be distinguished by discrete rather than continuous variables. The parameters which affect the choices tend to be few in number, and the outcomes of choices are certain, or nearly so.

The microeconomic models resemble economic models of choice making. Actors operating under a set of constraints allocate scarce resources to a hierarchical series of ends or goals. Many such models assume that actors attempt to maximize some valued state, although some authors have proposed more complex models of optimizations such as "satisficing," minimax strategies, and hierarchies of strategies (18, 274). In this fashion they avoid the rigidities often attributed to models of rational actors (139). There is a larger concern with the *outcome* of the decision and less emphasis on the *process* of decision making. These models are applied to situations with greater uncertainty and ambiguity, where the range of alternatives and the outcomes of choices are less well defined. The alternatives may be distinguished by continuous as well as discrete variables, and many parameters may influence them. Barth's (12) efforts at generative models of social organization are an example of such work. Borrowing from game theory, he attempts to explain political organization among Pathans as a structure which had emerged from a large number of individual decisions made by actors operating under different constraints. Ortiz's (220, 221) studies of planting and marketing decisions by small-scale farmers in Colombia are another example. Although these models can be criticized for taking the goals and constraints as givens and failing to examine the patterns of resource distribution, they have been of considerable use in anthropology as in political science and economics.

The potential links between ecological anthropology and actor-based models are strong, but they have not been utilized extensively. Ecological anthropology, particularly in its first two historical stages, emphasized the importance of environmental factors in shaping collective patterns of behavior. The neglect of the examination of individuals which this focus has often produced may be explained in part by the repudiation of the examination

of individual actors by early ecological anthropologists (327) and in part
from the neofunctionalist and neoevolutionist emphasis on systems in which
aggregates and aggregate variables were accorded more importance than
individuals. Conversely, actor-based models have tended to treat environ-
mental variables as part of a relatively static set of external constraints to
which individuals respond and adapt. This tendency is particularly strong
in studies which focus on small areas in short periods of time. They have
thus omitted some of the concerns of ecological anthropology. Despite the
lack of effort in this direction, ecological anthropology can offer actor-based
models a richer understanding of the dynamic that operates within the
system of constraints; and actor-based models can permit ecological an-
thropology to examine the proximate factors which influence the behavior
of individuals and of aggregates. The integration of the two is particularly
favorable to the processual studies in ecological anthropology; the ecosys-
tem and decisions made by individual actors affect each other reciprocally.

The microeconomic models of decision making are preferable to the
cognitive ones in this synthesis, although the latter may also be of use in
certain well-defined areas of behavior (9, 10, 57a, 109). In general, the
alternatives are often characterized by continuous rather than discrete vari-
ables, by many parameters which influence the selection among them, and
by uncertainty as to the outcomes. A concern for the interaction of actors
with ecosystems would lead to a primary focus on the outcomes of deci-
sions.

Processual Ecological Anthropology, Biological Ecology, and Evolution

The emphasis on individual decision making also corresponds to recent
developments in biological ecology, with its stress on natural selection on
the level of individual organisms as a principle which organizes populations
and communities (176, 185, 245). The links between microeconomic and
ecological models have been drawn to show parallels between consumer
choice and foraging strategies, investment behavior and life-history strate-
gies, locations of firms and refuging behavior, market behavior and preda-
tor-prey interactions, and the like (146, 241). In addition, the criticisms that
the neofunctionalists and neoevolutionists have established a rigid separa-
tion between synchronic studies of homeostatic equilibria and diachronic
studies of long-term evolution directly parallel the criticism that earlier
work in ecology, typified by Odum and others, fails to synthesize adequately
energy-flow studies and studies of ecosystem succession. The efforts of these
ecologists to link the two through ecosystem-level processes such as ecosys-
tem strategies and maturity have run into serious difficulties. Major re-
search projects along these lines in the International Biological Program did

not generate as powerful results as were expected, and system modeling and simulation has also been relatively unrewarding. Both biological and human ecology have shifted from system-level statics and dynamics to utilizing individual action as a basis for emergent higher-level processes (252). Many biologists have begun to challenge the order and regularity of the sequence of successional stages. The links among diversity, stability, and ecosystem maturity are also questioned (58, 75, 157); the stability of some ecosystems has been shown to rely on climatic stability rather than on mechanisms internal to the ecosystem. The role of external stresses and catastrophes in influencing ecosystem structure and function has also attracted considerable attention (41, 65, 218, 224), paralleling the interest in the response of populations to environmental stress in ecological anthropology. The links with demography and biological ecology have led in many cases to increased efforts to define and operationalize variables, to include new methodological procedures for assessment of environmental variables, and to apply tests of statistical inference with greater rigor (166a). Furthermore, these parallels between cultural and biological ecology have generallly been proposed (245) more cautiously than was the case with the neofunctionalists. Rather than claiming that natural selection forces organisms to behave as if they operated with the same rational calculus that human actors are presumed to use, it can be suggested that these homologous optimization models facilitate the examination of the ways in which human action affects ecosystems and environmental constraints influence human decision making. They also allow interdisciplinary research efforts to proceed more easily. The questioning of the neofunctionalist approach has led to an ability to study productive activities (83, 166b, 332), settlement patterns (166, 324), and the like without attempting to show how they maintain human populations in equilibrium with their environments. In this way the processual approach and Stewardian cultural ecology may be seen to share some approaches. (The "principle of alternating generations" also links them.) Some research (207) on hunting typifies this work. Hunting behavior in traditional settings has been compared to the predictions of hypotheses on optimal foraging strategies in biological ecology. In some cases the hunters deviate from these predictions, because the most prestigious or culturally desirable meat is not always the most efficient or least risky to catch in energetic terms (80), or because fear of observation by members of other social groups constrains patterns of movement (179, 180).

Components of Processual Ecological Anthropology

DEMOGRAPHY   Demographic decision-making models are closely tied to the specific trends in processual ecological anthropology mentioned earlier.

in this section. They bear on the recent work in demography and anthropology which has contributed to processual ecological anthropology. Neofunctionalist work emphasized negative feedback mechanisms which maintained populations at static levels: neoevolutionists looked at the broad details of human demographic history, and often missed the details of particular cases.

A seminal work in this field is Boserup's *The Conditions of Agricultural Growth* (31). Her well-known hypotheses reverse Malthusian descriptions of human demography to suggest that population pressure causes rather than follows agricultural intensification; people shift from more efficient extensive systems to less efficient intensive ones only when driven by the necessity of feeding more individuals. The general outlines of her argument and the details of her sequence of stages in agricultural intensification have attracted a great deal of attention. Many authors have pointed out the shortcomings of her excessively simple scheme, and indicate that other factors can also influence the sequences of agricultural intensification; these include market systems, political pressures, and environmental variables. Boserup's work and studies by Spooner (286) and others (14, 17, 25, 37, 61, 113, 124, 126, 190, 203, 307, 325) stimulated by it may be classified as processual, for several reasons. The effort to assess the links between population pressure and agricultural intensification have led to diachronic studies (190) in which changes in single groups are traced through time; research in other areas for which little historical reconstruction is possible has been carried out by examining the covariation of population density and agricultural intensity (34a), with the assumption that current distribution of associations resembles past sequences. The studies often rest on an implicit decision-making model in which actors actually allocate scarce resources (labor) in order to achieve goals (food production). The mechanisms of change are seen in the connection between population and resources, linked through systems of agricultural production and the necessity to feed local populations. Individual decisions have cumulative consequences which lead to broader change; shortening of fallow periods may lead to a shift from communal tenure to private property, for instance. Other work links demographic and ideological change (20).

ENVIRONMENTAL PROBLEMS   Vayda & McCay (311, 312) argue that the literature on the response to environmental problems is an important shift away from the strong focus on energetics and from the assumption of stable equilibrium; as they show, it also permits an examination of individual as well as population responses to environmental forces. Waddell's (314) work on the response of the Fringe Enga in highland New Guinea describes three types of responses to three levels of frost intensity and duration, with

larger (though still subpopulation) sets of individuals acting in cases of more severe potential or actual damage to crops. Earlier work by Vayda (308, 309) and others (120) on the nature of warfare and the choice of different forms of attack rather than other responses to certain situations similarly makes the point that the nature of the response can be correlated with the scale of the problem. Other works show that responses can vary on individual as well as collective levels to natural stresses such as storms (17), droughts (171, 212, 232, 243), famine (159, 219), and earthquakes (210). Laughlin's (163, 164) well-documented analysis of the responses of the So in East Africa to periodic crop failures is another good example of use of decision-making models and the analysis of environmental problems. Britan & Denich (33) address similar issues in Newfoundland and Yugoslavia in cases of secular rather than cyclical change. Some efforts (209a) have been made to quantify environmental hazards.

ADAPTIVE STRATEGIES   The notion of adaptive strategy follows closely from that of decision making. The idea of adaptive strategy suggests that individuals, by repeatedly opting for certain activities rather than others, construct alternatives which others may then choose or imitate. It is also congruent with the emphasis on strategies and fitness in evolutionary biology (304). A focus on adaptive strategies leads to an examination of the manner in which a larger number of choices made by individuals can influence the wider setting (27, 47a, 178, 278a, 300, 323, 330). Rutz's (258) analysis of household decision making in a Fijian valley, for instance, shows the unplanned village-level consequences of interaction between households and their resolution of competition over different types of land. McCay (186) examines two types of adaptive strategies among Fogo Islanders as responses to a period of decline in the nearby fisheries. Individuals and households may adopt "diversification" and "intensification" responses, and the latter in particular led to outside intervention by governmental agencies, which made the environmental problems more severe. The concept of adaptive strategy, however, is often more elusive than one might suspect, as suggested by definitions such as Bennett's (22, p. 14): "the patterns formed by the many separate adjustments that people devise in order to obtain and use resources and to solve the immediate problems confronting them." The issues of the consciousness of the adaptive strategies and the ease with which they may be adopted are often not wholly confronted; the same work by Bennett on a region in the Canadian Great Plains recognizes four strategies (rancher, farmer, Hutterite, Indian) but does not fully examine the consequences of the fact that it is easier for farmers and ranchers to shift between those two strategies than to adopt the Hutterite or Indian one.

MARXISM   It is at this juncture that the contributions of Marxism become evident. The important role of Marxism in the two earlier stages of ecological anthropology makes its contributions in the third stage appropriate. If adaptive strategies are seen as the outcome of decision making, or repeated allocation of scarce resources to a hierarchy of goals under conditions of constraint, then it is necessary to examine the pattern of resource distribution and the source of the goals and constraints. This is precisely the contribution of recent work in Marxism, including much structural Marxism (29, 103, 111) and the new political economy. In particular, a reconsideration of the notion of mode of production questioned the rigid sequence of succession of modes and the determination of the superstructure by the base (140, 172, 215), paralleling a rejection of neoevolutionism and neofunctionalism. Dependency theory raised similar issues on the relation of economics and politics and suggested the importance of an examination of world systems. This work is compatible with the emerging interest in political economy within anthropology (1, 36, 49, 114, 119, 151, 180, 213, 250, 269, 273), the concern for a historical materialist perspective (59), and an emphasis on the links between local populations and wider systems (31a, 36a, 259), including regional studies (16), studies of complex society (334), and a world-systems perspective (217). This work thus contrasts with the neofunctionalist ecological anthropology, which often adopted the local population as its unit of analysis. For a structural Marxist critique and reply, see (102) and (240). Each social formation may be seen as having a characteristic set of forces and relations of production and an associated superstructure. This social formation is pushed toward transformation by conflicts within the base, between the base and superstructure, and between the social formation and its wider natural and social setting. Any social formation is a transformation of the ones that preceded it. This criticism is similar to the one made by Sahlins, that ecological anthropology reduces culture to "protein and profit" (266, p. 45), that it misses the fact that activity and ideology form a coherent structured whole of meaning and its expression. This criticism also attacks the lack of satisfactory treatment of the mechanisms which generate human behavior on the part of many neofunctionalists and neoevolutionists.

Social Organization, Culture, and Process

One analyst (235, p. 34) of social conditions in Argentina, in attempting to explain living conditions to a junior colleague, pointed out the necessity for weighing the relative influence of geographical and institutional factors. The choice between environmental factors on the one hand and social and cultural ones on the other is not so simple, since the nature of their relations goes beyond the old debate between determinism and possibilism (36a).

[This debate continues to resurface, as may be seen, for instance, in the discussion of similarities and differences between blacks and East Indians in the Caribbean (66, 83, 100).] Environmental factors interact with social and cultural ones, and neither operates independently.

The neofunctionalists claim that the basic facts of technology, environment, and demography determine social structure and culture (131), and an extreme culturalist point of view, such as that of Sahlins, would argue that culture must be seen on its own terms. A useful place to compare the two approaches and to incorporate the Marxist contributions is the Pacific, an area where Sahlins and many of Harris's associates have worked. The contrast between Melanesia and Polynesia is an instructive one. In the period before European contact, the two areas shared a generally similar technology, including tools (dibble sticks, bamboo knives, stone axes) and crops [taro, yams, breadfruit, banana, coconut (8)]. There is considerable variety of environments in the Pacific, ranging from high volcanic islands to low coral atolls, from areas with high rainfall to others with low rainfall, but Melanesia and Polynesia each possess this wide range of habitats (34, 302). Population densities at the time of contact are harder to establish, but they varied in both areas from the order of one to two individuals per square kilometer to densities a hundred times larger. However, the cultures and social structures were quite different, since the areas were settled in separate migrations (326). The differences between the two areas stand out. The sharpest is the contrast between the Polynesian chief and the Melanesian big man drawn by Sahlins (264); the relative orderliness of chiefly succession in Polynesia, the ability of the chief to command his followers, and the success of linking smaller chiefdoms into larger kingdoms (112) are all quite distinct from the more individualized careers of the big men, the uncertainty of their rule, and the difficulties of establishing larger political units in Melanesia. The postcontact histories are also different; states formed in parts of Polynesia and cargo cults arose only in Melanesia. The two different systems also are connected with different ideologies, the famed *mana* and *tabu* of Polynesia, and more complex and varied beliefs about ancestors, sexual differences, warfare, and the like in Melanesia. The contrast between ancestor spirits in Melanesia and a fixed pantheon in Polynesia may also be noted. These general patterns are quite distinct, and it would be hard to dispute that what makes Tikopia strikingly Polynesian is the culture and social structure brought by the people who settled it; similar technologies, environments, and population densities are found in Melanesia. [There are two types of cases where the distinction is less clear: (*a*) the small, disaster-prone atolls; (*b*) medium-sized chiefdoms, where more abundant resources allow incipient stratification in Melanesia and smaller island size limits the elaboration of chiefly power in Polynesia (e.g. Trobriand and Marquesas).]

Nonetheless, the environment influences social structure and culture in important ways. For Polynesia we can return again to Sahlins's work. *Social Stratification in Polynesia* (262), despite its tendency to neglect the importance of intrasocietal conflict in shaping social structure and some tautologies in the measures of productivity, argues strongly that environmental and technological features (variations on a common Polynesian pattern with some elaboration of irrigation and drainage) account for the particular variations on the common Polynesian theme of chiefly political organization and hierarchically arranged descent groups. The data from Melanesia are less clear and variation within Melanesian social organization is greater than was once suspected (48, 87). However, for similarities between highland and lowland Melanesian groups see (255). Europeans were less interested in them than in the Polynesians, so records for the contact period are poorer. Since the islands are closer, more involved in interisland trade, and were settled earlier, the specific association of social and cultural systems with each island environment is less immediate. However, there is also some association of environment and social structure, as shown by the larger political units in eastern Melanesia (264).

In other words, the environmental factors which influenced social structure and culture were mediated by certain patterns, different for Melanesia and Polynesia. [Cody & Mooney make an analogous ecological argument about Mediterranean climates (52)]. It would be almost impossible to reconstruct the early political histories of the Polynesian chiefdoms, for example, but one can assume that the settlers arrived with certain cultural and institutional patterns that bore a strong resemblance to those of other Polynesians, and that these patterns offered the settlers certain goals, placed constraints on their choices, and thus influenced their social, economic, and political history. Not surprisingly, the largest, richest, and most diverse islands, such as Hawaii, Tonga, Samoa, and Tahiti, supported the largest, most complex, and stratified political systems, and the chiefs had much less power on the smaller island societies; in neither case did they resemble Melanesian social structure on similar islands. Sahlins (265) shows that Tonga social structure and culture is a permutation of their counterparts in Fiji; he argues that this case demonstrates the supremacy of culture over material forces (107). But the matter might have been argued differently: environmental and other material forces favor certain of the many possible transformations of a given social structure and culture. Labby's (160) work, for example, incorporates material factors into an otherwise idealist structuralist analysis of Micronesian social organization.

To take another similar example, Sahlins states that Western meat preferences reflect deeply rooted cultural meanings rather than their nutritional

quality or availability; Harris & Ross (133) present a contrary position, that preferences for different sorts of meat mirror their availability and quality. Sahlins argues by alluding to the symbolic meanings attached to animals in other domains, which transform biologically edible animals such as cattle, swine, dogs, and horses into distinct cultural degrees of edibility and inedibility; Ross (251) juxtaposes data on animal production and meat preservation in the United States with statements on relative preference for cattle and swine. One might argue that the truth lies somewhere in between, as does one analyst (322) of American commodities interested in predicting future levels of consumption; if the price of one type of meat goes down, people will buy more of it, but certain traditional preferences change slowly. It might also be argued that both are wrong since neither one focuses on individuals as actors, but rather on superorganic systems. It is difficult for Sahlins to account for changing food preferences, and Harris & Ross (133) cannot explain lags in changing availability and consumption patterns. Decisions about diet, like many other decisions, are not always made fully consciously, and they reflect a number of goals and constraints, yet their cumulative impact is large.

   The relative isolation of island societies and the recent settlement of some make the examination of the interrelation of social and cultural patterns with the environment particularly clear in the Pacific case. Another similar case, however, may be found in Europe. In a study of an alpine valley in northern Italy, Cole & Wolf (54) find striking differences between a Germanic and a Romance-speaking village, despite similarities in environment, technology, and population. Though both villages are Catholic, they partake of the somewhat different cultures of northern Europe and the Mediterranean. The inheritance patterns (335) in each, for instance, represent a compromise between the respective cultural ideals of impartible and partible inheritance on the one hand and the exigencies of alpine agriculture and livestock raising on the other; the two are close but still distinct. Settlement patterns and village political systems also reflect the cultural differences between the two. These facts are taken to indicate some "doubts . . . about the usefulness of ecological anthropology in the study of complex societies" (54, p. 284); it might better be argued that it is neofunctional ecological anthropology whose utility is dubious. The history of each village includes a series of contacts with other villages and wider political units; this, however, is also true of most Melanesian and many Polynesian societies as well. The two villages are the outcome of a long history of interaction between environment, social structure, and culture in the valley and surrounding region. The debate about whether they really have more in common as Alpine peasants or less in common as Germanics and Latins is not wholly

to the point; rather the individual, household, and village decisions over use of land resources and the decisions over ambiguous and shifting political alliances generate the different patterns.

A complementary approach to the one adopted in the Oceanic and Alpine cases is to look at areas with relatively uniform cultures and social structures but varying environments. Such work has been done in the Maya region, where general Mayan patterns of patrilineality and virilocality are shown to covary with population density (55, 56). The numerous works which discuss the impact of the fur trade, technological changes, and population shifts on the hunting and trapping Indian groups of Canada may also be reviewed in this context (28, 105, 152, 248, 272, 280, 282, 284, 298, 306). They also demonstrate the advantages of abandoning the population as the unit of analysis, since they include both individual and nuclear families as actors and examine the wider economic and social context, and the articulation of trapping economies with the capitalist world system and competition between imperial powers. Similarly, variations on a common Andean pattern of social organization may be related to differences in ecology and political economy. There are several core features in the area [bilateral inheritance (219), dual organization, extension of ties to affines and ritual kin, several modes of reciprocal exchange (3), verticality (198, 244)] which combine to generate different patterns. The tension (161) between an adult's ties to a spouse and to married siblings, for instance, is resolved differently in pastoral and agricultural settings (62, 96, 218). Access to different types of land depends on ecological and political economic features (36, 61a, 104, 135, 183, 192, 267, 337). The varying nature of affinal links and reciprocal exchanges reflects scarcity of different factors of productions (184). In all cases, however, these variations are based on common Andean elements of social organization. Such studies (2, 118, 189, 254) exist for other culture areas as well; other authors follow a similar perspective in explaining relatively late state formation in Madagascar (158), East Africa (315), and Southeast Asia (333). Analogous biological arguments (21, 271) can be made about temperature regulation in vertebrates. Physiological systems are coordinated in various ways for a variety of purposes in different environmental settings. The temperature regulatory systems are the outcome of particular evolutionary histories of different species, reflecting their prior physiologies and the environmental pressures to which they were subject. In general, an examination of evolution must consider both phylogenetic inertia and environmental forces. To understand the evolution of bats, it is instructive to study both the elements which they have in common with other mammals and those which they share with more distantly related but functionally similar species of flying insectivores and frugivores. Parallels

can readily be drawn with the previous examples of Oceanic societies and high-altitude peasant groups in the Alps and Andes (244). It should be stressed that these analogies are not intended to suggest that the same processes or mechanisms operate in human history and biological evolution, nor that culture and species are similar entities.

Mechanisms of Change

In processual ecological anthropology, decision-making models can provide a mechanism of change because there is interaction between the choices which actors make, behaviors on an individual and group level, and the biological, social, and cultural systems which influence the distribution of resources, constrain the possible adaptive strategies, and provide some of the goals which the actors attempt to meet. In this view, culture and ideology are not seen as epiphenomena but as proximate causes which shape human action. They influence the options among which individuals select and in turn are influenced by the cumulative consequences of such choices. This view facilitates the synthesis of recent Marxist work and ecological anthropology. These points are supported by recent literature on Highland New Guinea (31a, 187, 188, 195, 279, 299, 320), the Philippines (7, 74, 82), pastoral nomads (148, 225, 226, 269, 270, 278a, 305), and other groups (64, 78, 115, 275, 288, 329).

Other writers, dissatisfied with such eclecticism, have sought more concise and formalized presentations of mechanisms of change. One approach is the previously mentioned cultural determinism of Sahlins and others. His treatment of "transformations" (265), however, looks at qualitative change without examining the quantitative change with which it is inextricably and dialectically linked. To draw an analogy, he would suggest that a comparison of a few frames from a film is sufficient to depict the events and processes which were recorded. Such still photographs, though, even if they were analyzed in detail, could not portray motion. The view of sociobiology (47) is that human behavior, like that of other species, is shaped by the dictates of natural selection on genetic variation. This point resembles that of other writers who emphasize population size and growth as an indication of adaptation, although it differs on insisting on a genetic rather than a cultural basis of behavior. The debates surrounding this approach will not be summarized here. [It is worth noting, however, that arguments made in sociobiological terms can frequently be recast without any reference to the genetic basis for behavior. Thus, in a recent article, Dyson-Hudson & Smith (81) present an argument that human territorial behavior follows the predictions of ecological theory with regard to spatial patterns of resource use and defense; they show that territoriality among Basin-Plateau Indians, the

Northern Ojibwa, and the Karimojong is consonant with such predictions, but neglect to state that they are equally consonant with an economic cost-benefit analysis model of allocation of effort. They fail to recognize the proximate mechanisms by which individuals choose to utilize certain locations and not others.]

Other works link cultural and genetic processes, following Campbell, who "argues that the necessary conditions for the existence of natural selection are met as well by culture as by genes: the trait must be heritable, it must vary between individuals and the replication of trait-bearing individuals must be theoretically infinite but limited in practice" (246, p. 130). Some efforts to link the two emphasize genetic factors more heavily, as Irons' (149) notions that individuals choose the behaviors which maximize their fitness and Durham's (76) argument that culture traits which will maximize biological fitness are more frequently retained. Efforts to apply these models have been limited in success; one need not assume, as Irons (150) does, that Turkmen strive to be wealthy because wealthier Turkmen have more children and biology makes people want to do things that will allow them to have more children (148, 149, 247); and Durham's analysis of fertility differentials (76, 77, 79) has little bearing on his examination (78) of socially mediated patterns of resource utilization which led to the 1969 "Soccer War" between El Salvador and Honduras. Other writers give equal emphasis to both, as Cloak's (50, 51) discussion of "self-replicating instructions" and Ruyle's (260a) concepts of "cultural and genetic pools." Two sets of works, by Richerson & Boyd (32, 32a, b, 246) and by Cavalli-Sforza & Feldman (42–45, 88–91), construct more general and formal models of dual inheritance systems in which the relations of genetic to cultural fitness can be specified rather than assumed. These approaches (233) can potentially examine a wide range of cases; their empirical analyses have so far tended to be restricted to a very general analysis of human kinship behavior in which some of the deviations from the predictions of sociobiology have been explained. A recent exploration (32b) of the behavior of employees in firms demonstrates the potential of extending dual inheritance theory to other areas of activity. These writers apply the methods of populations genetics and evolutionary ecology to culture-bearing organisms, but do not assume that genetic theories alone apply to people. Culture and genes are treated as systems of inheritance, with related but distinct properties. The success or failure of these dual-inheritance approaches remains difficult to assess. Their efforts to unravel the interaction of biology and culture in human kinship systems, for example, though suggestive are still preliminary. It is notable, however, to see biologists and social anthropologists engaging in a debate as colleagues (50, 246).

Specific Cases

Two recent works which exemplify processual ecological anthropology are *The Raft Fishermen* (98) and *Fields of the Tzotzil* (55). The former analyzes the retention of fishing from rafts in a Brazilian village where boats, which would permit larger catches, are also available. The study examines a local population but places it in the contexts of extralocal economic and political systems. Forman's explanation begins with the decisions that individual actors make. He shows that local elites would be able to dominate the fishermen even more thoroughly than they currently do if the shift in fishing techniques took place. The fishermen accurately perceive that they would have an absolutely as well as a relatively smaller share of the total catch if that catch were increased by shifting to boat fishing. The lack of change is thus a dynamic rather than a static equilibrium; if certain aspects of external domination were to change (such as the system of patron-client relations on the regional and national level), the local situation would change as well. [However, Forman (97) has recently been criticized (60, 186) for leaning toward neofunctionalism in making relatively unsubstantiated claims that secrecy about identifying fishing spots serves to reduce competition and prevent overfishing, and his analysis of kinship has been challenged on methodological grounds (191).]

Collier's study in southern Mexico addresses a generally similar question, the reasons for the retention of traditional identities among peasants, as Indians in distinction to *ladinos* and as members of specific communities (*municipios*) in distinction to other such communities. He shows the benefits that these identities would confer on individuals and the difficulties which the loss of identities would bring about. He examines local systems of production in detail and shows the consequences of demographic increase and external pressures on them. He thus retains much of the systems orientation of earlier work without falling into a functionalist bias. The detailed data on changing patterns of lineage composition, land tenure, and labor utilization systematically document the response of individuals to shifting environmental and demographic constraints, and the historical material shows the impact of the cumulative consequences of these decisions on the environment and wider economic and political systems. He also integrates regional and national level processes with the study of local populations more thoroughly than Forman. This work thus draws on the areas of processual ecological anthropology mentioned earlier—the relation of demographic variables and production systems, the response of populations to environmental stress, and the formation and consolidation of adaptive strategies. This work, however, has been criticized recently both implicitly and explicitly for failing to analyze correctly the role of Chiapas

and the Indian populations in regional, national, and global economies. Wasserstrom's (257, 316–319) research, drawing heavily on recent Marxist work, shows the importance of systematically considering the demographic patterns, ritual activities, and work organization in this wider context. Highland Indians' life was even more directly influenced by regional and national elites than Collier would suggest.

This debate over Chiapas resembles disagreements over another more famous ethnographic case: the Nuer. Sahlins's (263) reanalysis shows the organizational strength of the segmentary lineage system. More recently, attempts have been made to relate the presence of the segmentary lineage system among the Nuer and its absence among the neighboring Dinka to different levels of population pressure (206) and to differential spatial patterns of resource distribution (110). Southall (285) offers a detailed analysis of both factors. Sacks' (261) interesting recent treatment emphasizes political economy. The Nuer and the Dinka had different historical experiences with traders from other areas, and these relations led to these characteristic patterns of internal differentiation. As in the case of Chiapas, though, different explanations focus on political economy on the one hand and local ecology and social structure on the other. Efforts at synthesis of the two are still incomplete.

Similar aspects of processual ecological anthropology are shown in the February 1977 issue of *American Ethnologist* devoted to human ecology. Seven of the 11 articles examine the rationality of individual actors and the manner in which external constraints shape their choices. There is a corresponding deemphasis on concepts such as carrying capacity and homeostasis which were favored by the neofunctionalists. It is significant that all the articles examine complex state societies rather than small-scale societies. Neofunctionalist ecological anthropology, which was more focused on local populations in homeostatic equilibrium with their environment, restricted itself to such populations. The greater time depth possible in complex settings, and one series of responses of different groups within such societies, demonstrates the importance of historical change rather than of static equilibrium or long-term evolution, justifying the label of "processual" for such studies. This setting in complex societies clarifies the importance of extralocal ties and of the access to extralocal resources which the neofunctionalists neglected. These settings, as Forman and Collier show, are ones in which conflict can be examined. These aspects of social organization were greatly neglected by neofunctionalists, whose focus on the adaptation of local populations led them to assume that the interests of all individuals and groups within the population were similar and compatible. Aside from a functionalist examination of primitive warfare, a discussion of conflict appears in only a few cases of works by neofunctionalist ecological an-

thropologists, notably Barth (13) and Leeds (170), both of whom have used actor-based models with considerable success in the analysis of social and economic organization of complex societies. Some nonstate settings have also attracted processual ecological anthropologists (36a). New Guinea allows for the testing of Boserup's hypothesis on demographic pressure and agricultural intensification, and the nature of Melanesian social and political organization makes actor-based models particularly appealing. Nevertheless, many of the factors identified in complex societies are at work elsewhere, and even the supposedly isolated local populations studied by neofunctionalist ecological anthropologists have undergone processes of historical change and rely on extralocal resources, as shown by Anderson's (5) criticisms of Rappaport's (236) analysis of Tsembaga in highland New Guinea, Helms' (142) analysis of Miskito Indians in lowland Central America, studied by Nietschmann (207), and Schrire's (275a) reexamination of the San (166, 166b) of southern Africa.

CONCLUSIONS

Processual ecological anthropology is a reaction to neofunctionalist and neoevolutionary approaches, which were also responses to the pioneer work of Julian Steward and Leslie White. Adopting an historical time frame, rather than examining synchronic homeostatic equilibria or the many millenia of human history, permits a closer focus on mechanisms of change. By studying units other than the local population on which the neofunctionalists concentrated, studies have been carried out of larger units (political economy) and smaller ones (actor-based models). The elimination of functionalist assumptions has had several consequences: (*a*) a focus on the mechanisms which link environment and behavior; (*b*) an ability to incorporate conflict as well as cooperation by recognizing that not all goals are population-wide; (*c*) more precise studies of productive activities, settlement patterns, and the like without assumptions about equilibrium maintenance.

Processual ecological anthropology draws on several recent trends in the social sciences: demography, an examination of environmental problems, the concept of adaptive strategies, and recent work in Marxism. Decision-making models link all of them. The gap between anthropologists and biologists is also narrowing, as specialists in each field become more aware of work in the other and have begun efforts to link the two theories (as in dual inheritance approaches) and to borrow more cautiously than in the past. The homologies between actor-based models and natural selection favor this connection between sciences without assuming that they are

virtually identical as the sociobiologists do, and the ecosystem ecologists, neofunctionalists, and neoevolutionists did.

The incorporation of decision-making models as mechanisms of change has led to a greater emphasis on social organization and culture. Social and cultural systems influence the goals which actors have, the distribution of resources which they use, and the constraints under which they operate. It appears likely that the comparative work in ecological anthropology will emphasize culture areas, as in the Pacific, European, Mayan, and Andean cases mentioned here, as well as the comparisons of evolutionary stages and production types which characterized the neofunctionalist and neoevolutionary stages. As this work progresses, materialist and idealist approaches in anthropology are likely to find more common ground through a more thorough interpretation of culture and ideology as systems which mediate between actors and environments through the construction of behavioral alternatives.

As ecological anthropology draws closer to biology and history, it becomes enriched and enriches other fields. Although it incorporates models and research methods from other areas of anthropology and other disciplines, it must rework them to suit its own needs rather than adopt them blindly. This association with other fields, however, creates the danger of a fragmentation of ecological anthropology into a series of specialized areas of inquiry. The current diversification, though it shows a growth of new lines of productive research, could lead to a loss of analytical coherence. An examination of theoretical issues and of the complex history of the field is therefore an urgent task. Future developments in ecological anthropology thus rest on an understanding of the new common elements in processual approaches—the importance of the time frame, the role of actor-based models, a clearer focus on mechanisms of change, and a more balanced position on the role of social organization, culture, and biology.

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