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Michael Bollig | Franz Krause

Environmental Anthropology

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Environmental Anthropology

Current issues and fields of engagement

Haupt Verlag

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Contents

Anthropology, Ecology and Environments: an Introduction

Why Environmental Anthropology?

Society and culture are core concerns in anthropological research and practice. But social relations and cultural meanings are not limited to ideas and practices among humans alone. Rather, we live, grow, relate, create, struggle and find meaning in a world that is as material and ecological as it is cultural and social. Human lives are immersed in a universe that includes materials from vital clean water to toxic wastes, a world of other beings from microbes to animals, and a plethora of ways of knowing and dealing with all of them. All this is what we call "the environment". Studying the ways people inhabit their more-than-human environments teaches us that ecological relations are fraught with politics, competing claims and knowledges, long histories and injustices, but also that they are sites of creativity, hope and resilience. Furthermore, ecological knowledges and practices may differ radically among people, so that some may understand their interactions with plants and animals as "social" while others see them as "ecological"; some may chiefly trust "spiritual" sources, and others "scientific" ones; and while some may see a forest as comprised of "relatives", others approach it as "resource".

For example, among the Ehdiitat Gwich'in and Inuvialuit inhabitants of the Mackenzie Delta in the Canadian Arctic, sharing is an important obligation. When someone catches a lot of fish, or wins a big lottery, they share some of it with their relatives, friends and neighbours. When part of the majestic Porcupine Caribou Herd moves close to the delta, hunters get meat for their families and for sharing around. The Porcupine Caribou Herd is one of the most viable caribou populations of North America, despite tangible climatic and landscape changes in their territory. But their viability is at risk: the herd's calving grounds at the Arctic Ocean coast are also said to be rich in oil and gas. Currently, the area is protected for the sake of the caribou, but every so often, political leaders campaign to open it up for hydrocarbon extraction, which is likely to have catastrophic effects on the Porcupine Caribou Herd.

On the other side of the delta roam the Cape Bathurst and Bluenose Caribou Herds – or rather, what is left of them. They have gone through a steep decline in recent decades. Today, hunting is strictly regulated, with only a few licences available to Inuvialuit and Ehdiitat Gwich'in hunters. The decline of these herds also acts as a warning of what may happen if the other herd diminishes: not only less "country food", esteemed as a healthy source of nutrition that sustains human bodies, and a reduction in valued practices of travelling and hunting throughout the region, but also less sharing of caribou meat, and thereby less forging and maintaining kin

and friendship relations. Wildlife biologists have suggested ways of managing caribou sustainably. Indigenous hunters often follow their advice, but some offer other explanations for the state of the herds. It is not for humans to pretend to manage animals, they argue, because the land provides for humans as long as they behave properly. Animals must be treated with respect, which means putting effort into hunting them, using as much of their carcasses as possible, and indeed sharing the meat. If hunters and their families work respectfully with caribou, the herd will not fail them. The land, too, shares with its inhabitants.

While this is a story about a culture and society that values sharing, it is at the same time a story about ecology, where animal populations wax and wane, and calories gathered from vast areas by migratory caribou find their way into people's households. The two sides of the story are so interwoven with each other that it makes little sense to tell one side without the other. Sharing and exchange, for example, were long considered the stuff of economic anthropology, but examples like this illustrate that economic issues are also ecological, and vice versa. Furthermore, the knowledges informing how people relate differently to the same environments are part of this story, and so are the institutional arrangements and power dynamics that enable, say, a decision maker in Washington DC to permit hydrocarbon drilling in the Porcupine Caribou Herd's calving grounds.

Anthropology is particularly well positioned to study and articulate the messy and multidimensional processes that shape social-ecological issues and environmental conflicts. With its method of "participant observation" it attempts to gain a perspective from below, grounded in the experiences and knowledges of the people involved rather than reproducing globally dominant discourses. With its ideal of holism – considering life as a whole rather than splitting it up into disciplinary sections like "economy" and "religion" – and its global purview, anthropology is able to investigate topics across scales and sectors. And with its comparative impulse, anthropological research traces patterns from extractive industries to environmentalist movements across regions and continents. Anthropology is therefore often able to provide more grounded and more people-centred insights into environmental questions than other disciplines researching ecological issues.

Environmental anthropology studies how human society and culture are always also about non-human things and beings, and about their mutual relations as well as competing knowledges and struggles. Some scholars distinguish two fields: *ecological* anthropology, which studies relations between humans and their environments, including the flows of energy, situating people's lives in an ecological context; and *environmental* anthropology, which focuses on the social and cultural dynamics of environmental conflicts involving groups of humans with different knowledges, interests and powers. In this book, we do not emphasise this distinction. Some passages might read as more "ecological", others as more "environmental", but the book introduces them as aspects of one field of study investigating the more-than-human relations that shape human lives. By saying "more-than-human",

we point to the company of many other life forms, in which people's lives unfold, from the elements and biological organisms to spirits and gods.

Questions about the role of the more-than-human environment in society and culture have been with anthropology from the very beginning: to what extent are human ways of life adaptations to ecological constraints and possibilities, and in what ways do they operate independently from the material world? Today, there is broad consensus in the discipline that cultures and societies are not determined by their physical environments, but that these environments do play a critical role in social and cultural life. Environmental anthropology is a growing field, not least because of the widespread sense that human activities have plunged the planet into profound ecological crises, with drastic climatic changes, ubiquitous pollution and catastrophic rates of biodiversity loss. At the same time, people around the world have been organising social movements to resist destructive policies and projects, and to develop alternative ways of inhabiting the earth. Intergovernmental panels are organising large-scale meetings, like the so-called COPs (Conferences of Parties, for example to the United Nations Framework Conventions on Climate Change or Biological Diversity) to forge consensus on how best to address the vast global environmental challenges of our days.

These developments have led to an awareness that ecological issues and social issues are closely linked: social movements struggling for a cleaner environment are often also fighting for human rights, such as agricultural workers campaigning against the use of pesticides that are poisoning both themselves and the area's land and water, or Indigenous communities fighting against deforestation and for their land rights. Ecological crises and environmentalist movements have also made clear that particular groups of people cause more environmental changes than others. And while some people and organisms might benefit from, say, transforming a forest into a plantation, many others tend to suffer due to the same transformation and its effects. In many cases, structural issues like poverty and inequality matter more than individuals' decisions, and people may be entangled in destructive practices against their better judgement.

What Does This Book Offer?

This book provides insights into some roots and recent work in environmental anthropology. It focuses on current issues, research and fields of engagement, explaining what particular insights environmental anthropology bring to them. Our choice of approaches and examples is shaped by the fact that both of us work in Germany, while our respective research concentrates on Southern and Eastern Africa, and the Circumpolar North and Northern Europe. We present studies from around the world, from a point of view that is not limited to any of the major centres of Eng-

lish-language anthropology, but is informed equally by a number of minor anthropological traditions from across Europe and beyond.

The book is structured into four parts. The first part, "Roots", focuses on the history of environmental anthropology, the work of a few key researchers and the development of a number of sub-fields, including symbolic ecology, environmental history and political ecology. It describes fundamental concepts like "cultural ecology", "ecological anthropology" and "cultural materialism" in relation to the research that inspired their formation.

The second part, "Approaches", outlines four terms that stand for influential approaches in the field: landscapes, infrastructures, Anthropocenes and ontologies. The *landscape* concept highlights the close interdependence of humans and their environments, emphasising how the world "out there", its flora, fauna and morphological structure, reflects human politics and imaginations, and how humans deal with the challenges and possibilities these environments produce. A focus on *infrastructure* helps us understand how social relations, economic priorities and cultural beliefs have been engineered into the face of the earth to mediate the world by structures that manipulate material processes, but that often do not live up to their expectations. Although the concept of the *Anthropocene* was originally proposed by natural scientists to denote a global, geological epoch, it has been progressively embraced by scholars from the humanities who not only use it widely as a productive, interdisciplinary term, but also criticise homogenising visions of "humanity" and "the globe" for ignoring the blatant disparities between polluters and victims, rich and poor, powerful and powerless. Finally, recent debates about *ontologies* have revolved around the question whether all humans on the planet inhabit the same physical and ecological reality, and differ only in the way they understand and represent this world, or whether humans construct and inhabit different worlds altogether.

The third part sketches out four "Foci" in environmental anthropological work: water, plants and fungi, animals, and bodies. *Water* flows and social life shape each other in ever-new ways, so that municipal water supply, flood management, and irrigation reflect and reproduce dominant ideas and socioeconomic struggles. *Plants and fungi* have taken centre stage as anthropologists are studying how mushrooms connect remote landscapes and high-end markets, how the conservation of seeds spurs political conflict, or how plants communicate with other living beings and participate in the transformation of social and material worlds in often unforeseen ways. *Animals,* too, are actively involved in current environmental issues, from extinctions to meat mass-production and megafauna conservation, which anthropologists are studying through what has become known as multispecies ethnography. Human *bodies,* in turn, incorporate environmental changes and ecological harms that tend to be unequally distributed along racial, gender, class and colonial lines, exposing socially disadvantaged groups to higher levels of pollution and lower-grade nutrition.

In the final part, the book presents five "Fields" that have been central to recent environmental anthropology: climate change, disaster, extractivism, conservation and environmentalisms. *Climate change* is relevant not only regarding people's manifold perceptions of and adaptations to changing weather and climate, but also concerning competing knowledges about the phenomenon and opposing arrangements for dealing with it. Unlike sudden catastrophes that surprise victims and their governments, anthropology has treated *disasters* as events that are long in the making, emphasising the social, cultural and economic processes that produce disasters by exposing particular populations to possible hazards. *Extractivism* often causes dire consequences for targeted areas and their inhabitants, following the systemic parameters of global capitalism with its colonial echoes of dispossession and its imperative of acceleration. The *conservation* of more and more areas is often seen as a countermeasure to ecological destruction, but can also become yet a new means of displacing and depriving people and livelihoods, often for dubious goals. And while some speak about a global environmentalist movement, *environmentalism* is not a single thing, but is significantly shaped by specific local and regional concerns, from fears about ecological collapse to struggles for self-government or human rights.

We have placed this book's parts and chapters in a sequence that we consider useful for approaching the genesis, current approaches and significant applications of environmental anthropology. However, they can be read selectively in any particular order or by skipping individual chapters. Each chapter can serve as the basis for one course unit, such as a lecture or seminar session, but may also be used as an introductory reading for courses that focus on the respective topic, say, "water" or "environmentalisms". Each chapter includes boxes highlighting an exemplary ethnography which engages with the respective topic, and – where applicable – boxes showcasing the work of an anthropologist who works on this topic outside academia, in settings from activism and conservation to disaster relief and agricultural development. Key terms and specialist jargon are highlighted in blue script and briefly defined in a glossary at the end of the book. Every chapter closes with a set of "take-home messages" that summarise the key insights from the chapter, as well as a list of questions intended for reflection and discussion. Each reference list highlights, in blue script, a number of key readings for following up in more depth on the respective topic.

We hope that the following pages convey some of our enthusiasm for environmental anthropology as an important perspective on today's planetary crises, that they might inspire the reader to think differently about social and ecological life, and that they will spark engaging discussions in the classroom and beyond.

PART I

Roots

1 Cultural Ecology

Humans and Environments in Early 20th Century Anthropology

Interest in an in-depth focus on human-environment interactions in anthropology grew out of a dissatisfaction with paradigms dominant in cultural anthropology in the early 20th century. The founders of academic anthropology, Franz Boas in the US, Bronislaw Malinowski and A.R. Radcliffe-Brown in Great Britain and Emile Durkheim and Marcel Mauss in France, did not have a keen interest in the environment. Let us turn first to the US where cultural ecology developed in the 1930s.

In the 1920s, the Boas school shaped anthropology in the United States. Franz Boas clearly gave primacy to cultural factors. In his ethnography *Contributions to the Ethnology of the Kwakiutl* (1925), he described the subsistence economy and ritual feasting in great ethnographic detail but did not link environmental fluctuations back to social institutions or rituals systematically (Piddocke 1965). Boas considered the environment to be important when explaining why certain cultural elements did *not* occur but did not see how environmental dynamics could *explain* economic, social or even religious features of a society (Speth 1978). That certain environments provided the possibilities for very different social and cultural forms and only disabled some.

Boas's student Alfred Kroeber (1963) developed this "possibilist" perspective further. While he described the environment of Californian Indigenous Communities in some detail, he did not think that natural conditions had any sizeable impact on culture. He broadly stated, "While it is true that cultures are rooted in nature […] they are no more produced by 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" (Sinha and Sinha 1968/1969: 799, after Kroeber 1939: 1).

Daryll Forde studied with Kroeber in California in the late 1920s and brought the possibilist stance on culture-environment interaction to British social anthropology when he took up a position in Great Britain. Forde's widely read introduction to anthropology *Habitat, Economy and Society* (1934) formulates the possibilist postulate: "The habitat at one and the same time circumscribes and affords scope for cultural development in relation to the pre-existing equipment and tendency of a particular society" (ibid.: 464). Habitat is used by Forde as an alternative term for "environment". Forde remained an outlier in British Social Anthropology in the pre-World War II era. While giving environmental features some space in his ethnography, he did not attempt to systematically connect them to social institutions, symbols or religious beliefs. Forde, Kroeber and Boas were not very interested in establishing causal relations between the environment, social organisation and culture. Cultural ecology emerged as a new brand of anthropology, ambitious to

develop a "true" scientific paradigm that explained *why* societies and cultures had specific structures of social organisation and patterns of culture.

The "invention" of cultural ecology is attributed to the US American anthropologist Julian Steward (1902–1972). Steward had spent much of his youth in eastern California's Owens Valley. The arid landscape as much as the Indigenous Communities dwelling in it aroused Steward's curiosity. While Kroeber and Boas were born in Germany, and Forde in Britain, with none of them having had any prior life experiences in rural areas of the US, Steward grew up in the landscape that he later studied ambitiously. His first ethnographic fieldwork with the Native American Paiute people was situated only 30 km away from his previous school. At university, Steward took courses in anthropology, geology, zoology and archaeology, giving him a firm background in the natural sciences. He became fascinated by the ideas of geographer Carl Sauer, with whom he studied at Berkeley University in California, on the intricate interrelation between culture and the landscape: Sauer was very critical of environmental determinism, and studied instead how landscapes were shaped by humans (see chapter 3). In 1935, Steward joined the Smithsonian Institution's Bureau of American Ethnology in Washington DC as a researcher and did extensive field research on the Native American groups of the Great Basin, the vast arid area between the Rocky Mountains and California. The Shoshones in particular became his paradigmatic case study. The detailed documentation of their environment, their subsistence strategies and their social organisation helped him to formulate the principles of what he labelled "cultural ecology". In 1946, Steward left the Smithsonian Institution and took a professorship at Columbia University, New York. Within only six years, he supervised 35 doctoral dissertations. A number of young scholars who would later become successful proponents of neo-evolutionist, materialist, Marxist and ecological brands of environmental anthropology studied with him during these years, among them Stanley Diamond, Morton Fried, Sidney Mintz, Robert Murphy, Elman Service, Eric Wolf and Marvin Harris (see chapter 2). Notably, these young anthropologists were interested in social-ecological dynamics beyond northern America. They expanded Steward's paradigm of cultural ecology to cultural and political contexts far beyond Indigenous communities of northern America: colonialism, agro-industry and modernisation arose as important new topics. The subsequent paragraphs will have a closer look at Steward's approach.

What Is Cultural Ecology?

In his article *The Concept and Method of Cultural Ecology* (1955: 30–42), Steward broadly differentiates cultural ecology from human ecology and biological ecology. Whereas human ecology looks for universals in humans brought about by their genetic inheritance, and biological ecology is concerned with the non-human web of life, cultural ecology wants to find regularities of cultural development brought

about by the dynamic interrelationship between the environment, technology and social organisation of resource exploitation. Steward argued that "culture, rather than genetic potential for adaptation, accommodation, and survival explains the nature of human societies" (ibid.: 32). Steward (1955: 39–42) also proposed a distinct methodology for cultural ecology.

Steward's Definition of 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 [...] cultural ecology presents both a problem and a method. The problem is to ascertain whether 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." (Steward 1955: 36)

Steward's Methodology of Cultural Ecology

(1) "First, the interrelationship of exploitative or productive technology and environment must be analysed [...]"
(2) "Second, the behavior patterns involved in the exploitation of a particular area by means of a particular technology must be analysed [...]"
(3) "The third procedure is to ascertain the extent to which the behavior patterns entailed in exploiting the environment affect other aspects of culture." (Steward 1955: 40–41)

Steward sought causal explanations of cultural traits and found them in their interaction with particular environmental features, with technology and human labour mediating between the two. This triangle he called the cultural core (1955: 37). The cultural core is established in the interaction between the environment, technology and socially organised human labour. These interactions directly determine a set of primary features such as division of labour, land-tenure arrangements and modes of food storage and food consumption. This cultural core is hard to change and is less impacted by external influences than what Steward regarded as secondary features such as myth and folklore. Due to its close ties to the bio-geophysical environment, which according to Steward is unlikely to change rapidly, the cultural core is resilient and resistant to changes.

Steward's Key Concept: the Cultural Core

The cultural core refers to "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 greater 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." (Stewart 1955: 37)

In his book *Basin-Plateau Aboriginal Sociopolitical Groups* (1938), Steward gave a detailed account of foraging in the arid landscapes west of the Rocky Mountains. The chapters of the book provided insight into a meticulous and painstakingly exact way of gathering data on the environment, resource utilisation, socio-political organisation and ritual. Notably, though, Steward attempted to capture the specifics – climate, vegetation, fauna – of an environment that was characterised by seasonal and massive inter-annual variation. Human-induced changes of these environmental variables, degradation of vegetation or the near extinction of some wildlife species did not feature significantly in Steward's report. Hence, while Steward took great care to document environmental variation, he described a "natural" environment, unchanging and not (much) impacted by human land uses.

Steward considered archaeological data, historical sources and other literature available on the communities of the Great Basin Shoshone and Paiute and their history. He also interviewed elderly Shoshones and Paiute in Eastern California, Nevada and Utah, working across a broad area incorporating the diverse landscapes of the western United States. He could directly observe only some of the hunting and gathering strategies that he wanted to describe, and he had to turn to personal recollections and historical sources for further information. Clearly, the Shoshone of the 1930s were no longer pure hunters and gatherers, but had a rather diversified livelihood. The details of this newer livelihood, however, were not of great interest to Steward as he was eager to reconstruct a traditional foraging livelihood. Steward took great care to show how subsistence strategies and patterns of social organisation differed from place to place and from community to community: while traditionally, all communities hunted and gathered, they did so with different intensities, focusing on different species, applying different mobility strategies and organising themselves in very different ways. Steward showed that natural resources in most valley bottoms were scarce, scattered and highly unpredictable. In the following insert, Steward describes such characteristics and gathering strategies for the all-important pine nuts.

> **Pine Nuts and Their Harvest among the Shoshones**
>
> "*Pinus monophylla* Torr & Frém. [...]. The nut called *tuba* everywhere; the tree, *wakai* [....]. It is the most important single food species, where it occurs, but harvests are unpredictable. Each tree yields nuts once in 3 or 4 years. In some years there is a good crop throughout the area, in some years there is virtually none. In other years, some localities yield nuts but others do

> not. When a good crop occurs, it is far more abundant than the local population can harvest. The cones begin to open in early fall, the nuts first being knocked from the cones with a pole or the cones knocked to the ground then opened by pounding or roasting. Within a few days nuts begin to drop from the cones. The period during which they can be harvested is consequently 2 to 3 weeks, rarely longer; Ruby Valley, it was only 10 days. Had crops been reliable each year, and permitted a longer harvesting period, the harvest would have supported many times the population. Actually, a family sometimes procured enough for 1 year, rarely for 2, and frequently passed two or three winters without pine nuts, living on scanty supplies of other seeds. Cooked nuts might keep 2 years, but usually spoiled after a year. When burned from the cones, nuts were thereby cooked. Those picked up from the ground were stored green, according to OD [an informant], because coyotes would eat cooked nuts.
>
> The daily harvest per person varied considerably with the annual yield. Dutcher said 10 or 12 Shoshone women gathering in the Pauamint Mountains got 1 or 2 bushels a day. This would be about 100 to 250 pounds. Ruby Valley informants said a person could pick 200 pounds in 10 days. [...] If pine nuts were virtually the only food, a person could easily eat 2 pounds a day, or about 10 pounds for a family of five. In this case 1,200 pounds would last but 4 months. And 1,200 pounds is probably the maximum crop possible. Consequently it is not difficult to see why starvation by early spring was very common.
>
> Another feature of pine nut gathering is that the impossibility of harvesting the entire crop provided no motive for ownership of pinyon areas. Persons lacking crops in their own country were welcomed, even invited, to harvest elsewhere. Each family ordinarily traveled to a locality with a good crop, even if it were 50 miles away. This naturally threw different people into association in successive years. Once the crop was harvested, it was manifestly too heavy to carry any great distance. Consequently people wintered near the pine nut caches, usually in the mountains where there was timber for houses and for fuel. If, however, they had gathered near their habitual winter village, they returned home and packed down nuts from the caches as needed." (Steward 1938: 27–28)

Characteristically, Shoshone communities had no fixed foraging territories and accessed resources freely. Nuclear families strove for their subsistence for most of the year by themselves, adapting their mobility to the current availability of food resources and water across a vast area. While they occasionally travelled together with other families, especially when harvesting pine nuts, for the greater part of the year they pursued their subsistence activities independently as nuclear families. There was no form of family, village or band ownership of pine-nut lands or hunting areas. Cooperation, if needed at all, happened between the inhabitants of a winter village, in which some families congregated for the winter months, but was restricted to rare communal rabbit drives and a short communal ceremony in autumn.

In Steward's analysis, the Shoshones offered an illustration of a "family level of social organisation". Cooperation beyond the family was occasional and ephemeral. Why such a pattern of social organisation prevails is explained in terms of cultural adaptation to a specific configuration of natural resources and a given technology that

had a socially fragmenting effect: all plant- and animal-based foods had in common that they were highly unpredictable in time and space. The landscapes the Shoshones foraged in were arid, with rains in some patches being plentiful in one year and then failing for the following years. This was reflected directly in the availability of, for example, gatherable plants. While a given place may have yielded abundant food in some years, it may have produced next to nothing in subsequent years. In order to guarantee a certain degree of food security, a high level of mobility and an open-access tenure system was necessary. Steward argued that such an open-access regime and the "territorial interpenetration of families" (Steward 1955: 108) was necessary to prevent starvation and ensure survival. The specific pattern of social organisation was interpreted as a direct consequence of environmental and technological development factors.

Steward soon sought to link his ethnographic data on the Shoshones with a broader comparative agenda. He sought evidence for causal linkages between social organisation, resource exploitation and environment in comparison, by varying some elements within the cultural core: what happened if natural resources were more predictable than in the Shoshone case? What happened if other technologies could be applied to store food or to expand the range of foraging trips (e. g. by making use of horses)? The results of his comparison of forager societies from around the world are detailed in the next section.

Comparative Accounts of Foraging Societies

In *The Patrilineal Band* (Steward 1955: 122–142), the expansion of an article on the economic and social basis of "primitive bands" from 1936, Steward sought causal evidence of why a certain social pattern, the patrilineal band, existed in a number of foraging societies across the world. In anthropology, "band" is a term for small, mobile and informal groups of people, often extended families, characteristic of hunter-gatherer – or "foraging" – societies. While Steward regarded the simpler, family-based Shoshone type of social organisation as rather rare and peculiar on a global level, the patrilineal band – a band linked by descent traced through the father – was a more widespread pattern in many foraging societies. The cultural core of patrilineal bands was constituted by patrilineality, patrilocality (living together with male relatives), exogamy (marrying partners not related in the male line), land ownership through the patrilineage (passed down to sons), a simple bow/spear/club hunting technology and a characteristic set up of resources. These characteristics were astoundingly similar in all foraging societies of Steward's sample, while other characteristics, which Steward labelled as secondary or independent (e. g. religion) varied greatly and were apparently more prone to cultural diffusion. Steward postulated that this cultural core of patrilineal bands "resulted from ecological adaptations which, under the recurrent conditions of subsistence technology could vary only within minor limits" (Steward 1955: 122).

Steward selected his sample for comparison purposively. He drew upon cases of forager communities where he found a patrilineal band organisation. He then asked why they were similar in this important aspect of social organisation despite very different cultural histories: the Bushmen of southern Africa, the Congo Negritos of Central Africa, the Philippine Negritos, the Australians, the Tasmanians, the Ona and Tehuelche of Tierra del Fuego and some southern California Shoshone-speaking groups. The ethnonyms are Steward's wording. Today most communities would be named and name themselves in different ways. Steward concentrated his comparative analysis on the triangle of material characteristics of natural resources, exploitative technology and social organisation of resource exploitation and asked: why was the cultural core of these societies so strikingly similar?

Steward argued that the following factors "produce" the patrilineal band pattern, i. e. produce a certain cultural core.

Steward's Cultural Ecological Model of the Patrilineal Band

"1. A population density of one person or less – usually much less – per square mile, which is caused by a hunting and gathering technology in areas of scarce wild foods;
2. an environment in which the principal food is game that is nonmigratory and scattered, which makes it advantageous for men to remain in the general territory of their birth;
3. transportation restricted to human carriers;
4. the cultural-psychological fact, which cannot be explained by local adaptations, that groups of kin who associate together intimately tend to extend incest taboos from the biological family to the extended family thus requiring group exogamy.

These four factors interact as follows: the scattered distribution of the game, the poor transportation, and the general scarcity of the population make it impossible for groups that average over 50 or 60 persons and that have a maximum of about 100 to 150 persons to associate with one another frequently enough and carry out sufficient joint activities to maintain social cohesion. The band consists of persons who habitually exploit a certain territory over which its members can conveniently range. Customary use leads to the concept of ownership. Were individual families to wander at will, hunting the game in neighboring areas, competition would lead to conflict. Conflict would call for alliance with other families, allies being found in related families. As the men tend to remain more or less in the territory in which they have been reared and with which they are familiar, patrilineally related families would tend to band together to their game resources. The territory would therefore become divided among these patrilineal bands." (Steward 1955: 135)

Steward's analysis has numerous flaws, including its male-centredness, the little-reflected-upon term "cultural psychological facts" and the sweeping assumptions about the relation between conflict, alliance and territoriality. On the positive side, though, we find a systematic approach that seeks the causal factors of cultural patterns and social dynamics and that gives environmental variables a key role in such an explanatory scheme without falling for environmental determinism.

The Emergence of Ancient Civilisations

From the 1940s, Julian Steward was interested in applying his paradigm of cultural ecology to very different cultural settings. Would cultural ecology also yield explanations for complex societies?

Steward (1949) attempted to explain cultural dynamics in early civilisations with his cultural ecological approach in an article first published in the journal *American Anthropologist*. Steward focused on similarities in the development of early civilisations emerging in arid and semi-arid areas, i. e. those sharing similar resource characteristics: northern Peru, Central America, Mesopotamia, Egypt and China. His analysis is based on extensive reading of archaeological literature. Steward established a typical sequence of development and discovered a striking similarity of trends. Development started with a phase of incipient agriculture, during which farming was supplementary to hunting and gathering and social groups had a semi-nomadic lifestyle. Towards the end of this period, farming supported some more sedentary communities. During the subsequent phase, small-scale irrigation emerged in these communities. The following phase saw an expansion of irrigation and significant increases in population. Most civilisations in Steward's sample developed ceramics, weaving, basketry and metallurgy during this phase of expanding irrigation systems. Furthermore, the construction of "religious edifices" was a characteristic of this formative phase. Two kinds of goods were developed during this phase: simple domestic wares for commoners, and highly stylised goods that served the needs for representation of an emerging theocratic class. Subsequent to the "Formative Era" no significant technological advances were made until the Iron Age.

After depicting the history of production, Steward turned to the parallel development of social, religious and military patterns. While early villages were situated on the hilly flanks of the valley, during subsequent phases the riverine floodplains became densely settled and "as need arose to divert water through canals to drier land, collaboration on irrigation projects under some co-ordinating authority became necessary" (Steward 1950: 202). A theocratic class facilitated cooperation. It dominated society and ceremonial centres, and a large number of religious objects gave evidence of its power. Society became differentiated into a theocratic elite and a commoner class. During the subsequent phase, such stratified communities morphed into small states which were ruled by a class of religious experts. When these incipient states reached the ecologically set limits of agricultural productivity, population pressure led to a growing competition between these states and the emergence of a military (ibid.: 206). Increasing state control was accompanied by warfare and the emergence of armies under the control of rulers. As empires expanded, irrigation works became ever more sophisticated and reached the limits of water supply. The final chapters of this evolutionary sequence displayed astounding parallels across the continents: cultural florescence was followed by rebellion, political disintegration and a demise of irrigation works (ibid.: 204). During this

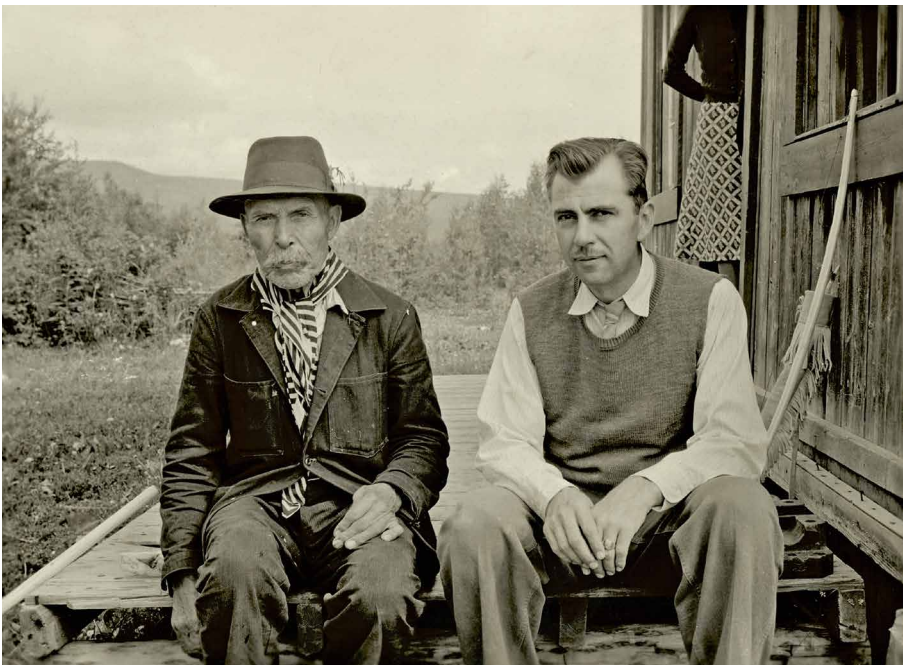

Fig. 1.1: Unidentified Native Man (Carrier Indian) (possibly Steward's informant, Chief Louis Billy Prince) and Julian Steward (1902–1972) sitting outside of a wood building, 1940. The case of the Carrier Indians informed Steward's comparative account of forager societies. Photo by National Anthropology Archives (Smithsonian), NAA INV.02871300.

final period of conquests, some important social changes occurred, the most notable being the trend towards urbanisation. Differences between social classes such as nobles, priests, warriors, commoners and slaves were emphasised, occupational groups were progressively differentiated, laws were codified, knowledge and learning were systematised, art became more standardised, and some trade goods were mass-produced by specialists, giving rise to widespread interregional trade.

Steward specified a number of environmental parameters (e. g. aridity in the wider landscapes, perennial rivers coming from surrounding mountains, the presence of alluvial banks apt for irrigation agriculture), detailed food-producing technology and then related a certain kind of production and political control to it. His major result: these societies all developed in a very similar way, and phases of development are very comparable across the globe. Differing from the models of unilinear evolutionists who posited that all societies undergo the same evolutionary sequence, with Western Europe and North America as the most advanced cultures, Steward's model of *multilinear evolution* was highly context-specific. Environmental and technological factors were the major determining variables at the outset of cultural evolution. Would the same also hold true for modern societies where global flows of products and finances shape production?

Cultural Ecology in Modern Complex Societies

In 1947, the University of Puerto Rico forwarded a request for a study on the cultural anthropology of the Puerto Rican people to US American funding agencies. Puerto Rico, a former Spanish colony, had been formally part of the US since 1917 and Puerto Ricans were US American citizens. The application of the University of Puerto Rico for a social-science study on different segments of Puerto Rican society was forwarded to Julian Steward. Together with his team he designed a comprehensive comparative study on the archipelago's different communities. The study, funded by the Rockefeller Foundation, was carried out by 10 researchers who stayed in the field for 19 months. The US American team of anthropologists worked together closely with scientists from Puerto Rico and some parts of the study were conducted entirely by local scientists. Hence, the Project may be considered as one of the first interdisciplinary collaborative research projects in the history of anthropology.

The Puerto Rico Project asked how the principal types of farm production were associated with "aspects of cultural behavior and with the individual's status and role within the community" (Steward et al. 1956: 2). The field studies were conducted by young scholars who were to bring cultural ecology into the final decades of the 20th century: Sidney Mintz conducted the study on sugar cane plantations and plantation workers (see chapters 2 and 4) and Eric Wolf, who later was instrumental in the foundation of political ecology, worked with coffee farmers. The box below presents some highlights of the Puerto Rico Project from the summary of the principal investigator Julian Steward.

The Puerto Rico Project: Tobacco, Coffee, Sugar Cane

"Tobacco growers: Our study of a tobacco *municipio* shows that certain changes have accompanied the introduction of the cash crop. [...] cash goals have led to individualization of landownership, and, since population has increased beyond the agricultural resources, farms tend to be divided among heirs to the extent that individual holdings are often insufficient to support the family. This individualization has been a major factor in disrupting the extended family. Duties and obligations to the extended kin group have become secondary to responsibility for the immediate family. The trends in land use and landownership have reduced the functional household and familial unit to the nuclear family. [...] These tobacco farmers have a new value orientation based on monetary standards and the importance of individual effort. [...]

Coffee growers: The coffee haciendas are of interest less because they involve large numbers of persons today [...]. Coffee cannot be the poor man's cash crop, for it requires a fairly large capital outlay. Unlike tobacco, which can be grown on plots of any size and during brief periods, coffee requires a fairly large acreage in order to justify the processing equipment; and since it does not bear for several years after planting, the owner must have resources to carry him over. [...] the tendency is towards large holdings which are worked by peasants or landless laborers. [...] since coffee production can be carried on profitably in isolated areas which lack improved

> roads and communications, the farm population tends to remain socially and culturally isolated from the urban centers. [...] The productive arrangements of the large haciendas set the framework for the survival of the traditional culture. [...]
> Sugar cane growers: The sugar regions of Puerto Rico exhibit the most pronounced effects of industrialization upon the rural cultures. Since sugar is produced competitively for an outside market, it is necessary that the most modernized methods be used [...]. The mills cost a half million dollars [...] and in order for them to operate at maximum efficiency, cane from a vast acreage must be fed into them. Sugar, therefore, tends to be monocrop, and subsistence farming, which is so vital to the rural people of other areas, is virtually eliminated. [...] The corporate community on the south coast consists almost entirely of a very homogeneous group of workers [...] having descended in part from slaves. There is no upper class today, for the private owners have sold out and moved away. Their economic functions have been taken over by a handful of managers representing the American cooperation. [...] In the typical labor-class family all members who are old enough work for wages, which gives a measure of independence to each individual. [...] because divorce is frequent and children generally remain with the mother, the family has matrilineal and matriarchal character." (Steward 1955: 213–219)

Steward was adamant that the emergence of different Puerto Rican subcultures was linked to specific agricultural technologies placed in particular environments and to their different demands on cooperation and capital input, labour organisation and property rights. The work of the Puerto Rico Project displays little of Steward's earlier environmental-technological determinism. Global forces, capital markets and political structure are of as much importance as environmental factors in explaining Puerto Rico's socio-economic structure.

Alternative Roots of Environmental Anthropology

We have singled out Julian Steward here as the lead scientist developing the paradigm of cultural ecology. It is certainly true that Steward established the academic field of cultural ecology and educated the first batch of US American anthropologists dedicated to environmental anthropology. More space would have allowed us to look at contributions of other scientists, both men and women, European, Australian, Chinese, and Indian, to the emerging field. As far as we can see, these scientists did not establish explicit schools of thought, nor did they lay the foundation for institutes dedicated to environmental anthropology. Nevertheless, many others contributed significantly to anthropological knowledge and theorising on the subject matter. The following paragraphs try to give a rough and much abbreviated overview of anthropological contributions to human-environment relations beyond Steward's cultural ecology paradigm. These are flashlights pinpointing where further research on the origins of environmental anthropology could look for sources.

In British social anthropology, Audrey Richards and E. E. Evans-Pritchard were perhaps the most prominent anthropologists of the pre-World War II period who highlighted the significance of environmental factors for cultural processes. Evans-Pritchard (1940) devoted an entire chapter in his famous ethnography *The Nuer* to "oecology". At the outset, he listed a number of environmental variables: topography, soils, vegetation, seasonality of rainfall, seasonal inundations and frequency of droughts. He alleged that "these characteristics interact with one another and compose an environmental system which directly conditions Nuer life and influences their social structure" (Evans-Pritchard 1940: 54). Evans-Pritchard chose vocabulary like "conditions", "determines" (ibid.: 61) and "forces" (ibid.: 63) to describe how seasonality shaped Nuer mobility and social life. In addition to seasonal rainfall, he took into account vegetation dynamics and insect life, claiming that during parts of the year the abundance of insects determined Nuer movements more than any other consideration. The Nuer integrated "'ecological time' with 'structural time' intrinsic to their kinship system" (Orr et al. 2015: 155). The major part of *The Nuer* is constituted by accounts of their kinship system and the political dynamics ensuing from it. In his later ethnography of the Nuer, focusing on marriage and ritual, and in work with other north-eastern African communities, Evans-Pritchard focused on social relations, history and religious life, and ecological considerations were not important features of his explanatory framework.

His contemporary Audrey Richards did ethnography on foodways and seasonal hunger among the Bemba of Zambia (at that time Northern Rhodesia). Richards's ethnography *Land, Labour and Diet in Northern Rhodesia* (1939) gave in-depth insights into human-environment interactions. Richards followed up two key question: why did the Bemba work their fields the way they did; why did they accept seasonal hunger and not opt for more intensive forms of gardening?

Richards showed that the way Bemba worked their fields was less determined by environmental variables than by their social system and their particular history. Nevertheless, in order to make her argument she detailed the local *citimene* land-use system (shifting cultivation) and reasoned that the poor soils conditioned this type of agriculture. While Richards's account of the *citimene* system is strong on the ethnography of labour practices and the technology used to clear the land, to grow plants on it and to control weeds, it is less detailed in its description of e. g. soil fertility, vegetation and the overall environmental impact of shifting cultivation.

Like Richards, the Australian Phyllis Kaberry was a student of Malinowski at the London School of Economics, but she also took direct inspiration from Audrey Richards's ethnographic approach, working as her assistant in the late 1930s. In the 1940s, Kaberry did fieldwork in Cameroon. Her ethnography *Women of the Grassfields* (1952) focused on the socio-economic role of women among the Nso of north-western Cameroon. Kaberry was perhaps one of the first anthropologists who focused solely on the role of women in agricultural labour. She left a large photographic archive detailing women engaged in everyday activities. Kaberry's anthropological

work in Cameroon had been directly inspired by the colonial administration, which sought insight into how to address the situation of women, which they regarded as of low status, utterly dependent on their male relatives and politically subdued. While Kaberry showed that Nso women had more command over their labour and the land they worked than anticipated, her work directly contributed to administrative measures improving the situation of women. Her ethnography is focused on labour practices and their determining factors in the kinship system and local politics and does not offer much detail on the particular environment the Nso lived in.

In the 1940s and 1950s, anthropology was developing rapidly as an academic discipline in countries beyond Europe and North America. Chinese anthropologists considered environmental matters as important early on. Lin Yaohua and Zhang Haiyang, two early Chinese environmental anthropologists, analysed the interaction between environmental factors, economy and culture in their study of ethnic minorities in southwest China in the 1950s. Cultural characteristics depended upon the local economy, which in turn was shaped by geographical conditions (Zeng and Luo 2022). Zhang Haiyang postulated four interconnected levels of analysis: (1) ecological basis, (2) livelihood, (3) form of social organisation, and (4) ideology. Both Lin Yaohua's and Zhang Haiyang's work included ideas that came very close to Steward's model of the cultural core, though it is very likely that they had never heard of it, as Steward was only translated into Chinese in the 1980s (Zeng and Luo 2022). Zhang Haiyang saw China's immense cultural diversity as directly connected to the diversity of environments. Chinese anthropologists also focused on the adaptive capacities of small-scale societies based on shifting cultivation or pastoralism (Yin 2000, Yang 2001). They documented how such societies coped with the challenges of tropical or arid environments and strove towards stability and sustainability through cultural strategies.

In India, social organisation, caste and hierarchy were dominant themes of early ethnography, and anthropologist L. P. Vidyarthi (1963) conceived the influential nature-man-spirit model in his ethnography of the Maler, an Indigenous community of the Bihar forested uplands. Vidyarthi postulated that nature, the spiritual world and human culture and social organisation are inextricably interwoven. He did fieldwork with the Maler in the early 1950s specifically looking at how the ecology of the forests and shifting cultivation technology shaped Maler livelihoods. But Vidyarthi went beyond a cultural core model à la Steward and argued that the Maler outlook on human-environment relations was not only shaped by ecology and technology but also in a very profound manner by their ideas about the spiritual world. Vidyarthi described four types of Maler spirits: ancestral spirits, benevolent spirits, evil spirits, and a more abstract spiritual power. The presence and absence of spirits determined a sacred geography established by ritual performances and other activities of ritual specialists, working the land in their spiritual way. The constant interaction between nature spirits is the core of Vidyarthi's *Nature-Man-Spirit Complex,* which became influential in Indian ethnography in the 1960s.

Take-Home Messages

- Cultural ecology evolved out of a critique of so-called "possibilist" and "diffusionist" approaches. With their focus on mobile cultural traits, these approaches were accused of underestimating the importance of environments.
- Julian Steward, who established the cultural ecology school of thought and educated several emerging environmental anthropologists, sought to analyse causal relationships between environments and sociocultural characteristics such as patrilineality, territoriality and emergence of centralised control over natural resources.
- At the centre of cultural ecology is the so-called "cultural core", consisting of the environmental factors, technologies and human work arrangements related to subsistence and economic activities. Sociocultural dynamics beyond this are understood as secondary cultural features in cultural ecology.
- Steward applied the theory and method of cultural ecology to diverse contexts such as hunter-gatherer communities, "ancient civilisations" and modern export-crop oriented economies.
- Other early scholars in the field of environmental anthropology, among them scholars from China and India, more closely highlighted themes like gender and spirituality.

Reflection Questions

1. Try to apply Steward's theoretical perspective of cultural ecology to your own society. What spheres and activities would you describe as the "cultural core"? What could count as secondary cultural features?
   a) To what extent is such a perspective appropriate and analytically revealing?
   b) In what way can the globalisation and digitalisation of today's world be integrated into Steward's thinking?
   c) What are the main limitations and necessary critiques of this approach?
2. What are the general strengths and weaknesses of cultural ecology?
3. As a main driver of culture change, Steward identifies changes occurring in the relationship between human (subsistence) work, technology and environmental features. Today we experience dramatic changes in our environment, caused among other things by the climate crisis, pollution, and environmental degradation. At the same time, the unequal distribution of wealth and availability of food allows some people to live prosperous lives seemingly unconnected to human-environment relations facilitating subsistence. How do you evaluate the relationship between, on the one hand, changes of the environment and environment-human relations and, on the other hand, sociocultural and political change?
4. Look more closely at one or more authors presented in the section "Alternative Roots of Environmental Anthropology". Why do you think their contribution is meaningful for today's study of human-environment relations?

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