

III: THE OUTCOME

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PART I

Starting Points, Theoretical and Factual

1. THE ECOLOGICAL APPROACH
IN ANTHROPOLOGY

The recent burst of efforts to adapt the biological discipline of ecology—the science which deals with the functional relationships between organisms and their environment—to the study of man is not simply one more expression of the common ambition of social scientists to disguise themselves as “real scientists,” nor is it a mere fad. The necessity of seeing man against the well-outlined background of his habitat is an old, ineradicable theme in anthropology, a fundamental premise. But until recently this premise worked out in practice in one of two unsatisfying forms, “anthropogeography” or “possibilism”; and the turn to ecology represents a search for a more penetrating frame of analysis within which to study the interaction of man with the rest of nature than either of these provides.

The Limitations of Traditional Approaches

In the anthropogeographic approach, of which the climatological theories of Elsworth Huntington are the most famous, if hardly the most sophisticated, example, the problem was phrased in terms of an investigation of the degree and manner in which human culture was shaped by environmental condi-

tions.¹ This position did not necessarily involve a thoroughgoing environmental determinism, because some variation in human culture independent of geographic forces was admitted by even the most extreme members of this school. But such variations were put down to "accident," the escape hatch of ethnology, or, on occasion, to "race," the escape hatch of biology. In the possibilist approach, on the other hand, the environment was seen not as causative but as merely limiting or selective. Geographical factors did not *shape* human culture—a wholly historical, even "superorganic" phenomenon—but they set boundaries to the forms it could take at any place and time. A. L. Kroeber's classic discussion of the confinement of maize-growing in aboriginal North America to regions where a 120-day period with sufficient rain and without killing frosts existed, is an example of this even more popular type of analysis: the nature of the environment does nothing in itself to stimulate the growing of maize, but it can insure the nongrowing of it.²

Neither of these views is simply wrong, yet both are inadequate for precise analysis. Geographic factors do often seem to play, as the anthropogeographers argued against the possibilists, a dynamic, not merely a passive role in the development of human culture. But at the same time the direct derivation of virtually any specific cultural practice from the nature of the geographical habitat as such seems to be, as the possibilists argued against the anthropogeographers, a nonsequitur: maize-farming may have been well adapted to the physical conditions of the pre-Columbian Southwest (or those conditions to it), but it can hardly be said to have been caused by them. The indeterminacy on either side here actually stems from a serious conceptual defect the two approaches share. Both initially separate the works of man and the processes of nature into different spheres—"culture" and "environment"—and then attempt subsequently to see how

¹ Huntington, 1945. See also, Semple, 1911.

² Kroeber, 1939, pp. 207–212. For other statements of the possibilist position, see Forde, 1948; and Wissler, 1926.

as independent wholes these externally related spheres affect one another. With such a formulation, one can ask only the grossest of questions: "How far is culture influenced by environment?" "How far is the environment modified by the activities of man?" And can give only the grossest of answers: "To a degree, but not completely."

The ecological approach attempts to achieve a more exact specification of the relations between selected human activities, biological transactions, and physical processes by including them within a single analytical system, an *ecosystem*. In ecology generally, an ecosystem consists of a biotic community of inter-related organisms together with their common habitat and can range in size, scope, and durability from a drop of pond water together with the micro-organisms which live within it to the entire earth with all of its plant and animal inhabitants.³ The concept of an ecosystem thus emphasizes the material interdependencies among the group of organisms which form a community and the relevant physical features of the setting in which they are found, and the scientific task becomes one of investigating the internal dynamics of such systems and the ways in which they develop and change. "When the ecologist enters a field or meadow," Paul Sears has written, "he sees not what is there but what is happening there."⁴

What is happening there is a patterned interchange of energy among the various components of the ecosystem as living things take in material as food from their surroundings and discharge material back into those surroundings as waste products, a process Haeckel, who was perhaps the founder of the field of ecology (at least he coined its name), aptly called "external physiology."⁵ And as in internal physiology, so in external, the maintenance

³ Dice, 1955, p. 2.

⁴ Sears, 1939, quoted in Clarke, 1954, p. 16.

⁵ "Just as morphology falls into two main divisions of anatomy and development, so physiology may be divided into a study of inner and outer phenomena. . . . The first is concerned with the functioning of the organ-

of system equilibrium or homeostasis is the central organizing force, commonly referred to in this context as "the balance of nature."⁶ If one takes, for example, a flock of sheep in a pasture, the sheep are, with their sharp, close-cropping teeth, apparently destroying the grass by ingesting it. But the sheep are also fertilizing the pasture with their manure. Thus, if the sheep were removed the pasture would, at least in many cases, be removed too; for trees would begin to seed and grow, finally killing off the pasture grass, and where once was a field would now be a wood. The sheep and the pasture form an integrated, equilibrated system, each of them dependent upon the other for its existence. Such equilibria are commonly, of course, quite complex—consider the neat balance between water, oxygen, light, heat, green plants, microscopic animals, insects, and fishes in a pond.

Nor does the inclusion of man as an element in an ecosystem change the nature of the basic principles. Clarke, from whom the sheep-in-the-pasture example is drawn, tells of ranchers who, disturbed by losses of young sheep to coyotes, slaughtered, through collective effort, nearly all coyotes in the immediate area. Following the removal of coyotes, the rabbits, field mice, and other small rodents, upon whom the coyotes had previously preyed, multiplied rapidly and made serious inroads on the grass of the pastures. When this was realized, the sheep men ceased to kill coyotes and instituted an elaborate program for the poisoning of rodents. The coyotes filtered in from the surrounding areas, but finding their natural rodent food now scarce, were forced to

ism in itself, the second with its relationships with the outer world. . . . By *ecology*, we understand the study of the economy, of the household, of animal organisms. This includes the relationships of animals with both the organic and inorganic environments, above all the beneficial and inimical relations with other animals and plants, whether direct or indirect." Haeckel, 1870; quoted in Bates, 1953.

⁶ Odum, 1959, p. 25. The most systematic treatment of homeostasis as a general phenomenon is Ashby, 1960.

turn with even greater intensity to the young sheep as their only available source of food.⁷

Nevertheless, the adaptation of the principles of ecological analysis and of the concepts in terms of which they are expressed (niche, succession, climax, food chain, commensality, trophic level, productivity, and so on) to the study of man can be conducted in a variety of manners, not all of which are equally useful.⁸ The simplest method is merely to view the whole of human society as basically a biotic phenomenon like any other and to apply ecological concepts to it directly and comprehensively, an approach characteristic of the school of "urban," "social," or "human" ecology founded by the sociologist Robert Park.⁹ In practice, most of such analyses turn out to be investigations in what might be more properly called "locational theory" than ecology. Not only are the biological concepts employed more analogically than literally, but a fundamentally a-cultural view of human society is adopted which sees settlement patterns, and in fact human activities generally, as an inevitable result of the free play of competitive "natural" (or "economic") forces, regulated, save for slight and temporary distortions introduced by customs, sentiments and values, by the principle of least costs. In any case, this reductionist use of ecology as an exclusive and comprehensive frame for the analysis of human community structure is not intended here. When we speak of ecological analysis we are concerned not with "explaining the territorial arrangements that social activities assume . . . the regularities which appear in man's adaptation to space,"¹⁰ but with determining the

⁷ Clarke, 1954, p. 19.

⁸ Bates, 1953, offers a survey of the divergent ways in which ecology has been used as a label for human studies, some of which amount to hardly more than sloganeering.

⁹ Park, 1934, 1936. For more recent formulations, see Hawley, 1950; and Quinn, 1950. For a brilliant and devastating critique of his whole approach, see Firey, 1947, pp. 3-38.

¹⁰ Firey, 1947, p. 3.

relationships which obtain between the processes of external physiology in which man is, in the nature of things, inextricably embedded, and the social and cultural processes in which he is, with equal inextricability, also embedded.

Cultural Ecology

Much closer to the perspective adopted here is that of Julian Steward, who has been developing a mode of analysis he calls "cultural ecology."¹¹ The distinctive feature of his approach is a strict confinement of the application of ecological principles and concepts to explicitly delimited aspects of human social and cultural life for which they are particularly appropriate rather than extending them, broadly and grandly, to the whole of it. The still powerful anthropological doctrine of "holism," which holds all aspects of culture to be fully interdependent, leads to a formulation of the culture-environment problem in gross overall terms and thus to the "there is something in both arguments" paradox already mentioned. Generally characterized habitat types—"the tropics," "the polar regions," "the high plains"—are matched to whole, and presumptively integral, cultures—"the Javanese," "the Eskimo," "the Sioux." On such a global level, Huntington, for all his simplistic excesses, can make a case that climate does somehow affect culture, for surely there is something vaguely arctic about the Eskimo, tropical about the Javanese. But Hegel can, with equal plausibility, dismiss environmental determinism with the fine Johnsonian argument that "where the Greeks once lived, the Turks now live; and that's an end on the matter."

Steward, however, rather than asserting that all aspects of culture are, in some indeterminate way, functionally interrelated, argues that the degree and kind of interrelationship is not the same in all aspects of culture, but varies. He attempts to isolate in the culture he analyzes certain aspects in which functional

¹¹ Steward, 1955, pp. 30-42.

ties with the natural setting are most explicit, in which the interdependency between cultural patterns and organism-environment relationship is most apparent and most crucial. These aspects of the wider culture he terms the "cultural core," while to aspects not so closely related to adaptive processes he merely refers, rather lamely, as "the rest of culture." And it is to the core alone that ecological analysis is relevant:

[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.¹²

A correlative analysis of the environmental side of the equation is also undertaken. It is reduced from a gross variable more or less identical to the whole habitat, geographically considered, to those selected features which actually have functional significance for human adaptation in any given case. Steward points out, for example, that noncultivating societies with essentially the same hunting technology (bow, spears, deadfalls) may differ in various ways as a result of the kind of animals which exist in their environment. If the main game animal exists in large herds, say, bison or caribou, it is adaptive to engage in cooperative hunting on a fairly sizable scale. Considerable numbers of people are likely to remain together throughout the year, following the herds as they move, driving them in mass surrounds, and so

¹² Steward, 1955, p. 37.

on. If, however, the game is of the sort which occurs in small scattered groups and does not migrate, it is better hunted piecemeal by small groups of men who know their immediate territory extremely well—large population concentrations being impossible at any rate. In the first situation, Steward argues, the elementary community will tend to be a relatively large, multi-family group, while in the second it will tend to be a small, localized patrilineal band. These cross-cultural organizational similarities occur, in either situation, not because of total habitat similarity, but because crucial elements in the environment—the type and distribution of game—are similar. Thus, the patrilineal band—small-animal situation is found among the Bushmen, who live in a desert, the Negritos, who live in rain forests, and the Fuegians, who live on a cold, rainy littoral plain. These groups show similar social structural features despite this contrast in habitats, because their environments are similar in the important matter, for hunting peoples, of the type of game they contain.¹³

These two exercises in the disaggregation of global variables, the discrimination of the “cultural core,” and the definition of the relevant environment, are directly reciprocal endeavors. If one empirically determines the constellation of cultural features which are most unequivocally related to the processes of energy interchange between man and his surroundings in any given instance, one necessarily also determines which environmental features have primary relevance for those same processes. The sharpness of the division between analyses from the side of “man” and analyses from the side of “nature” therefore disappears, for the two approaches are essentially alternative and interchangeable conceptualizations of the same systemic process. Ashby has formulated this fundamental principle in more general terms:

As the organism and its environment are to be treated as a single system, the dividing line between “organism” and “environment” becomes partly conceptual, and to that extent arbitrary. Anatomically and physically, of course, there is usually a unique and obvious dis-

¹³ Steward, 1955, pp. 122–50.

inction between the two parts of the system; but if we view the system functionally, ignoring purely anatomical facts as irrelevant, the division of the system into “organism” and “environment” becomes vague. Thus, if a mechanic with an artificial arm is trying to repair an engine, then the arm may be regarded either as part of the organism that is struggling with the engine, or as part of the machinery with which man is struggling . . . The chisel in a sculptor’s hand can be regarded either as part of the complex biophysical mechanism that is shaping the marble, or it can be regarded as part of the material which the nervous system is attempting to control.¹⁴

On a more explicitly cultural level the situation is similar. The Eskimo’s igloo can be seen as a most important cultural weapon in his resourceful struggle against the arctic climate, or it can be seen as a, to him, highly relevant feature of the physical landscape within which he is set and in terms of which he must adapt. A Javanese peasant’s terrace, to use a more directly pertinent example, is both a product of an extended historical process of cultural development and perhaps the most immediately significant constituent of his “natural” environment.

Nor, again, are only elements of so-called “material culture” conceivable in such terms. Intimately connected with the igloo are Eskimo settlement patterns, family organization, and sexual division of labor. Javanese rice terraces are closely integrated with modes of work organization, forms of village structure, and processes of social stratification. As one specifies more fully the precise nature of a people’s adaptation from the geographical side, one inescapably specifies, at the same time and to the same degree, their adaptation from the cultural side, and vice versa. One delineates, in short, an ecosystem within which certain selected cultural, biological, and physical variables are determinately inter-related, and which will yield to the same general mode of analysis as ecosystems within which human organisms do not happen to play a role.

¹⁴ Ashby, 1960, p. 40.

This mode of analysis is of a sort which trains attention on the pervasive properties of systems *qua* systems (system structure, system equilibrium, system change) rather than on the point-to-point relationships between paired variables of the "culture" and "nature" variety. The guiding question shifts from: "Do habitat conditions (partly or completely) cause culture or do they merely limit it?" to such more incisive queries as: "Given an ecosystem defined through the parallel discrimination of cultural core and relevant environment, how is it organized?" "What are the mechanisms which regulate its functioning?" "What degree and type of stability does it have?" "What is its characteristic line of development and decline?" "How does it compare in these matters with other such systems?" And so on. One conceives of the techniques of swidden agriculture as an integral part of a larger whole which includes alike the edaphic and climatological characteristics of tropical forest landscapes, the social organization of a labor force which must be shifted continually from field to field, and the empirical and nonempirical beliefs which influence the utilization of scattered and varied land resources. Consideration of wet-rice terracing widens out into the complex dynamics of a sort of self-sustaining aquarium on the one hand, and into questions of demography, underemployment, and moral valuations with respect to cooperative endeavor on the other. Yet such systems are bounded; they do not include everything. And, so bounded, the processes by which they develop, maintain their identity, transform themselves or deteriorate, can be specified—as can the influence of the external, parametric conditions which most significantly play upon them. Cultural ecology, like ecology generally, forms an explicitly delimited field of inquiry, not a comprehensive master science.

Yet it is necessary also explicitly to dissent from Steward's apparent assumption that although cultural ecology is not a comprehensive science it is nevertheless a privileged one. Referring to that part of culture "most closely related to subsistence activities and economic arrangements" as the "core" of it, while denoting

the rest of culture as "secondary," indeterminately shaped by the accidents of random innovation and diffusion, means begging the question. There is no *a priori* reason why the adaptive realities a given sociocultural system faces have greater or lesser control over its general pattern of development than various other realities with which it is also faced. The best that can be said for such a statement as "over the millennia cultures in different environments have changed tremendously, and these changes are basically traceable to new adaptations required by changing technology and productive arrangements" is that it brings what is elsewhere in Steward's work a *petitio principii* out in the open as a mere prejudice.¹⁵ It is a commendably ambitious proposition, but one which needs proof, not mere assertion. How much of the past growth and present state of Indonesian culture and society is attributable to ecological processes is something to be determined, if at all, at the end of inquiry, not at the beginning of it. And as political, stratificatory, commercial, and intellectual developments, at least, seem to have acted as important ordering processes in Indonesian history, the final awarding of prepotency to ecological developments seems no more likely than that they will turn out to have been inconsequential.

¹⁵ Steward, 1955, p. 15.