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# HEALTH AND THE HUMAN CONDITION

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## Perspectives on Medical Anthropology

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*Theoretical orientations in medical anthropology:  
change and continuity over the past half-century*

Although the term *medical anthropology* was not in general use before Scotch (1963a), work in many of the areas associated with the term has a considerably longer history. This paper examines the succession of theoretical orientations in medical anthropology over the past five or six decades, focusing on what each approach has tried to explain and on the shifts and continuities in theoretical emphasis. The aim is not to review the substance of developments in medical anthropology—this has been amply done in a series of summaries and syntheses by Caudill (1953), Polgar (1962, 1963), Scotch (1963a), Hughes (1968), Fábrega (1972), Lieban (1973), Colson and Selby (1974), and Foster (1974)—but to identify and compare the major conceptual models that underlie and frame substantive work in the field.

First, the continuities. To be sure, medical anthropology's historic roots are diverse (Foster 1974), and its current orientations and interests are varied (Lieban 1973). Nonetheless, one can identify a limited number of commonalities around which the discipline has developed. These commonalities consist of three empirical generalizations; that is, certain repeatedly observed regularities in nature that have been reference points for medical-anthropological study over the years. The three empirical generalizations, formulated in various ways by writers like Ackerknecht (1945a), Caudill (1953), Scotch (1963a), Polgar (1963), and Hughes (1968), might be stated as follows:

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1. Disease is a universal fact of human life; it occurs in all known times, places, and societies.

2. All known human groups develop methods and allocate roles, congruent with their resources and structures, for coping with or responding to disease.

3. All known human groups develop some set of beliefs, cognitions, and perceptions consistent with their cultural matrices, for defining disease.

These basic generalizations constitute both the strength and weakness of medical anthropology. Their strength is that they summarize and order a large number of specific observations concerning time, place, and people. Thus, they provide a rich empirical base and many points of departure for medical-anthropological research. Their weakness is that they can describe observed regularities in nature but cannot explain them.

This distinction between theories and theoretical orientations is deliberate. Merton (1967) observes that theory involves formulations that specify determinate relationships between particular variables. According to him, a theory is a set of logically interconnected propositions from which specific hypotheses are derived, which are prescribed by the theory and whose empirical testing must lead to confirming, modifying, or rejecting the theory. Put differently, a theory must attempt to explain something, and a well-formulated theory tries to explain that thing in terms of a causal sequence of interrelated variables capable of generating hypotheses that can put the theory to an empirical test. In this sense, we do not yet have much theory in anthropology generally or in medical anthropology specifically.

What we do have, as Kaplan and Manners note (1972), are theoretical orientations—broad postulates that involve characteristic ways of selecting, conceptualizing, and ordering data in response to certain sorts of questions. For example, functional orientation examines the interrelations among parts of a society, its culture, and perhaps even its ecosystem. A cognitive orientation deals with the modes of categorizing and structuring experiences that occur among different cultures and speech communities. Each orientation provides a general context for inquiry, identifies certain types of relevant variables, and serves to inspire hypotheses congruent with it. But while either approach can generate theories, neither is a theory. Rather, each is a broad theoretical orientation. In the same sense, the various approaches discussed in this paper are best viewed as theoretical orientations, not as theories.

As we examine theoretical approaches in medical anthropology, our core question is what has each of them tried to explain? More specifically, on what sorts of dependent variables have the different theoretical orientations attempted to shed light? Further, what explicit or implicit models have served as the framework of inquiry?

We proceed chronologically, starting with the work of W. H. R. Rivers and then analyzing the orientations and models in the contributions of Forrest Clements, Erwin Ackerknecht, Benjamin Paul, and a number of recent ecological

scholars. Although all the foregoing workers have influenced the thinking and research of other anthropologists, their selection here does not mean to imply that they have been the only or most outstanding figures in medical anthropology over the past sixty years. They have been selected because each typifies a distinct and important theoretical orientation, representing a significant modification over the orientation of the preceding worker.

#### Rivers: Native Medicine as Part of Culture

William Hallam Rivers (1864-1922) is perhaps better known for his contributions to ethnography and social organization (1900, 1906, 1914a, 1914b) than for his work in medical anthropology. He was originally trained as a physician and practiced medicine at various stages of his career. His primary legacy to medical anthropology consists of *Medicine, Magic and Religion* (1924) and portions of *Psychology and Ethnology* (1926), both published posthumously.

Although Rivers was by no means the first anthropologist to report on the medical beliefs and practices of nonliterate peoples, he pioneered in developing a formal theoretical orientation for his work in medical anthropology and in attempting systematically to relate native medicine to other aspects of culture and social organization. His formal framework was based on two propositions. The first was that primitive medical practices follow logically from underlying medical beliefs, that is, that native medical practices "are not a medley of disconnected and meaningless customs . . . [but rather] . . . are inspired by definite ideas concerning the causation of disease" (1924:51). His second proposition was that native medical practices and beliefs, taken together, were parts of culture and constituted a "social institution . . . [to be studied in terms of the same] . . . principles or methods found to be of value in the study of social institutions in general" (1926:61).

On the basis of his propositions, Rivers formulates a set of general statements concerning the nature of primitive medicine. In line with a preoccupation of early twentieth-century anthropology, these statements revolve around efforts to classify manifestations of primitive medicine as either magical or religious.

Rivers's basic conceptual model consists of three sets of variables. His dependent variable is observed or reported behavior of native peoples in coping with disease. He recognizes only one independent or causal variable—the group's "attitude toward the world" or what modern workers might term world view. A subclass of the attitudinal variable is a derivative variable, that is, a society's beliefs and concepts regarding the nature and causes of disease. Rivers further categorizes world view into three classes—magical, religious, and naturalistic—each with an associated set of beliefs and mode of behavior. Figure 1 shows a diagram of his scheme as a whole.

Rivers confines himself largely to the first two world views, magical and religious, defining them essentially in Frazer's terms (1890). The magical outlook involves belief in man's ability to manipulate forces in the universe, and the religious world view concerns belief in the control of events by the will of some super-

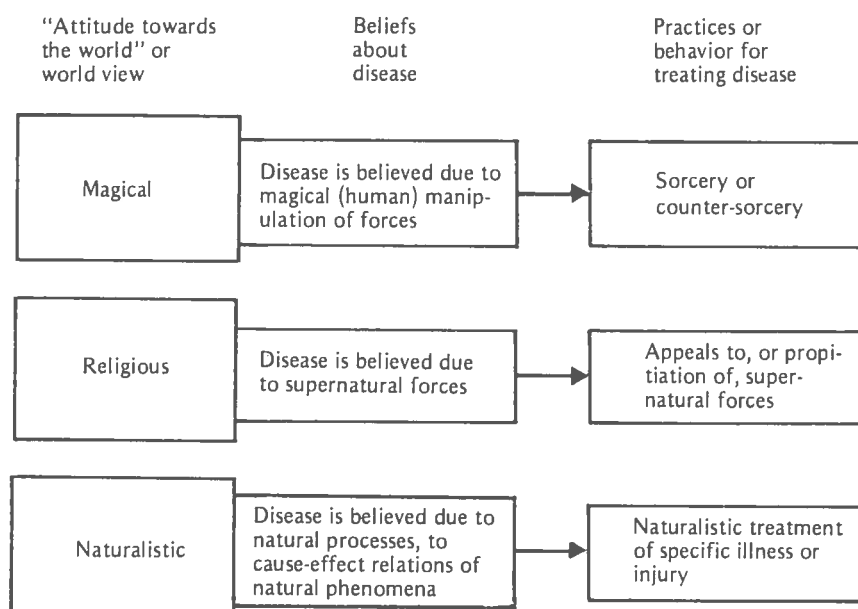


Figure 1. Rivers's Conceptual Model

natural power. Rivers deals only lightly with the third world view, the naturalistic. Defining it as the outlook that views phenomena as "subject to natural laws," he sees it as characteristic of the West and of modern medicine, not of primitive peoples. Although he acknowledges the occurrence among native groups of empirical and ostensibly naturalistic curing practices, he decides not to regard the latter as naturalistic within his terms of reference on the grounds that they are embedded in magical or religious matrices of belief.

Rivers also attempts to correlate the type of disease-related belief and behavior to an associated curer role. Thus, he sees the sorcerer as playing the key role where magic and sorcery predominate; the priest, where religious and supernatural explanations rule; and the leech (a generic term proposed by Rivers for traditional empirical curers), where the emphasis is on empirical techniques. However, this aspect of Rivers's scheme is wholly circular: he defines the type of medical belief and practice on the basis of role and the role on the basis of the prevailing set of disease-related beliefs and practices.

Although Rivers's model is essentially static, he does allow for change by placing the primary elements of his model on a change gradient, with the world views of native societies relatively fixed and unchanging, beliefs about the nature and causes of disease somewhat less impervious to modification, and medical practices most susceptible to change. He sees alterations in practices as occurring primarily through two processes: diffusion (cultural increments brought about through contact) and degeneration (cultural loss produced largely through cultural isolation).

Within Rivers's outlook, primitive and modern medicine constitute wholly separate universes of discourse. By focusing on world view and its linkages with belief and behavior, Rivers can find no way to accommodate magico-religious and naturalistic-scientific world views within the same domain of inquiry. As a result, Rivers's model precludes consideration of Western medicine and is limited to medicine among primitive groups.

Rivers deals with culture as though it were a closed system in which cultural facts can be explained only by recourse to other cultural facts with ultimate explanations to be sought in psychology. Despite his training as a physician, Rivers is indifferent to biological factors and allows no place in his model for them. Nor is he interested in adaptations to environment. Behavior is treated not as adaptive but as the product of beliefs that are in turn derived from a world-view.

Despite Rivers's constant and futile preoccupation with classifying manifestations of primitive medicine as either magical or religious, he provides an insight of fundamental and enduring significance: The elements of primitive medicine are not shreds and patches of inexplicable behavior but constitute a social institution, one as worthy of study as any of a people's institutions. In short, Rivers's contribution sets the stage for medical anthropology by pointing to the interrelationships between native medical practice and belief and by viewing both as integral parts of culture.

#### Clements: Primitive Medicine as Atomized Traits

Forrest Clements's monograph, *Primitive Concepts of Disease* (1932), involves an atomistic or "culture-trait" approach within a framework of historical particularism. Despite the work's conceptual and methodological muddiness, it is often cited as one of the classical studies in medical anthropology.

On an a priori basis, but without acknowledging that substantially the same classification had already been offered by Rivers (1924), Clements classifies disease-causation concepts among primitive peoples into five categories: sorcery, breach of taboo, intrusion by a disease object, intrusion by a spirit, and soul loss. He then proceeds to carry out two aims: charting the worldwide distributions of the separate traits as reported in the literature and, on the basis of charted distributions, inferring relative time sequences and routes by which each of the several traits spread.

Although references to Clements's scheme continue to turn up in the literature without critical comment, it should be noted that his classification of disease causes is a conceptual morass. To be sure, it includes two traits that can be categorized as causes: sorcery and breach of taboo. However, the remaining three—disease-object intrusion, spirit intrusion, and soul loss—are not causes but mechanisms. Each is a result of an effect attributed to human, supernatural, or other causative action.

The heart of Clements's study consists of a lengthy tabulation of each of the five etiologic concepts according to the region, tribe, or local group for which one

or more of the concepts have been reported. In all, about three hundred groups are listed. Clements then presents a series of world maps summarizing the distributions of the separate traits. The oldest trait is sorcery. He interprets the spatial distributions to indicate that some manifestations of sorcery go very far back in time, while others are relatively recent. The next oldest trait is object intrusion, followed by soul loss, spirit intrusion, and the most recent is breach of taboo.

However, one must be cautious in accepting the details of either Clements's trait-distributional data or his interpretations of time relationships and routes of spread. Years before Clements's work, Sapir had posed the same general question that Clements attempted to address: "How [are we to] inject a chronology into this confusing mass of purely descriptive fact?" (Sapir 1916, *in* Mandelbaum 1949:392). Sapir warned that there were conceptual hazards and methodological traps in charting the spatial distributions of traits and in making temporal inferences from them. Clements apparently ignored Sapir's admonitions.

Let us turn to Clements's model. Three assumptions that inform and underlie his entire study are implicit; they are not explicated. The first and most fundamental assumption is that were it not for the operation of diffusion brought about through geographic-historic factors (spatial propinquity, migration, and other modes of contact or spread), the distribution of traits would be essentially random. The second is that there are no functional relationships among any of the five traits and that the reported presence of two or more traits in the same society is a chance event. The third is that there are no necessary functional relationships between any of the traits and the economic, religious, sociopolitical, ecological, or other features of the societies in which they occur.

On the basis of these implicit assumptions, Clements constructs his conceptual model, diagrammed in figure 2. It holds that, other things being equal,

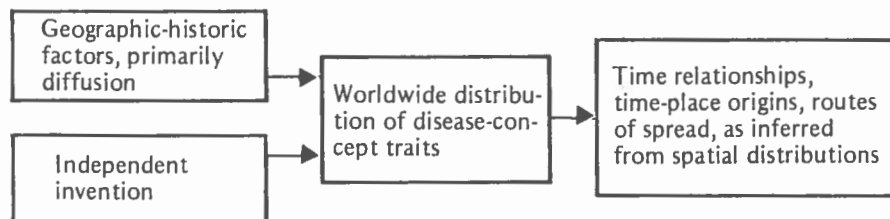


Figure 2. Clements's Trait-Distribution Model

diffusion and/or other historic-geographic events produce given profiles of distribution for each disease concept, and that relative time sequences and routes of spread—his dependent variables—can be inferred from the patterns of distribution. When the spatial occurrence of a trait makes diffusion an implausible explanation, that is, when other things seem not to be equal, Clements invokes the possibility of independent invention to account for the trait's presence. That is, a trait is developed separately in two different areas. In essence, the universe generated

by Clements's conceptual model is one in which isolated cultural traits enjoy time-place itineraries governed by little more than cultural contact or propinquity and are largely unaffected by the cultural milieu or adaptive needs of their host peoples.

Despite Clements's unfruitful conceptual model, he does make a positive contribution to the anthropology of medicine through his efforts to document the worldwide distribution of disease concepts. He attempts to buttress the third of the previously discussed empirical generalizations—that societies everywhere develop some set of cognitions for defining disease.

#### **Ackerknecht: Primitive Medicine as Culturally Patterned and Functionally Interrelated Elements within a Configuration**

The essential shaping of medical anthropology as a modern subfield of anthropology is the result of the work of Erwin H. Ackerknecht. His considerable contributions to medical anthropology are embodied in publications extending over three decades, beginning in 1942 (1942a, 1942b, 1943a, 1943b, 1945a, 1945b, 1945c, 1946, 1947, 1948, 1949, 1958, 1965, 1971). During the same period he has also written extensively on a variety of topics in the history of medicine. Like Rivers, Ackerknecht was first a physician and later an anthropologist. Unlike Rivers, he has done little or no first-hand field research among non-Western peoples. His research has been primarily in libraries and with museum collections.

Ackerknecht (1942b, 1971) publicly acknowledges intellectual debts to the British functionalists, to several American workers representing various facets of the Boasian tradition, and, in particular, to "the theoretical and personal influence of Ruth Benedict" (1971:9). In a series of papers written during the 1940s (1942a, 1942b, 1945a, 1946), Ackerknecht presents his theoretical orientation, expressing it in the form of five generalizations. His five generalizations and some of the views with which they take issue are:

1. The significant unit of study in medical anthropology is not the single trait but the total cultural configuration of a society and the place that the "medical pattern" occupies within that totality. This generalization is a rejection of trait-list and noncontextual approaches, as typified by Clements.
2. There is not one primitive medicine, but many primitive medicines, perhaps as many as there are primitive cultures. This generalization extends Benedict's cultural relativism and her insistence of the uniqueness of each culture into the study of native medical patterns. It also counters the view of Garrison (1914, 1933)—one of the most influential medical historians during the first third of the twentieth century—that all forms of primitive medicine are identical.
3. The parts of the medical pattern, like those of the entire culture, are functionally interrelated, although the degree of functional integration of elements at both levels varies from one society to another. Ackerknecht's



latter qualification is a mild and implicit corrective for what he construes as Benedict's extreme position regarding the internal integration and consistency of a culture's parts.

4. Primitive medicine is best understood largely in terms of cultural belief and definition, that is, without consideration of biologic, epidemiologic, environmental, or material-culture factors. Ackerknecht questions the determinants or causes of native medical patterns only to explicitly reject what he calls the "great temptation to explain the causal necessity of things in terms of psycho-biology, environment or material culture..." (1942b:574). Ackerknecht's view—that what non-Western peoples do and think about disease is relatively unaffected by the nature and distribution of disease or by considerations of adaptations to habitat, but that what they do and think is governed only or primarily by degree of fit with prevailing custom and belief—strongly shaped medical-anthropological inquiry during the 1940s and 1950s.

5. Finally, paralleling Rivers's and Clements's contentions, Ackerknecht insists that the varied manifestations of primitive medicine—however they differ and regardless of the acknowledged empirical efficacy of many primitive drugs and curing techniques—all constitute magic medicine. He denies the possibility of considering the medical patterns of primitive and of modern Western societies within a single universe of discourse on the grounds that "primitive medicine is primarily magico-religious, utilizing a few rational elements, while our [modern Western] medicine is predominantly rational and scientific employing a few magic elements" (1946:467).

Ackerknecht's conceptual model for dealing with primitive medicine, diagrammed in figure 3, is a sharply restricted one. He limits himself to two variables.



Figure 3. Ackerknecht's Medical-Anthropological Model for Primitive Societies

His dependent variable is the complex of medical belief and behavior, that is, the prevailing medical pattern. He attempts to explain or account for it in terms of a single, global independent variable—the society's overall cultural configuration. His model also includes the postulate that the parts of the medical pattern stand in some degree of functional relationship to each other and to the total culture.

Essentially, Ackerknecht's orientation represents an explicit effort to integrate the two primary theoretical currents in the social-cultural anthropology of the time: American historicalism and cultural relativism, especially Benedict's configurational approach, and British functionalism.

Ackerknecht's model has undoubtedly been fruitful. By focusing on the importance of the totality of cultural behavior in shaping the society's medical elements, directing attention to the patterning of medical belief and practice, and emphasizing the functional interrelationships among the parts of the medical pattern and between the latter and the total culture, his orientation stimulated the development of medical-anthropological inquiry within the mainstream of social-cultural anthropology of the 1940s and early 1950s. At the same time, despite his recognition that the phenomena of health and disease were both cultural and biological (1945a), his approach helped to confine medical-anthropological study to a virtually exclusive focus on cultural parameters until the late 1950s.

#### Paul: System and System Change

The formulations of Rivers, Clements, and Ackerknecht address essentially basic rather than applied issues. In contrast, *Health, Culture and Community* (1955), edited by Benjamin D. Paul, is designed primarily as a contribution to applied anthropology and public health. The volume is both a reflection of and stimulus for the international public health movement of the late 1940s and 1950s. Paul's central concern is not to advance basic research or theory but to examine "the immediate situation where medicine and community meet" (1955:4). To do so, Paul utilizes a model that differs from those of his predecessors, one oriented around the concept of system.

The term *system* receives no special emphasis in Paul's volume, and the concept is not among those elucidated in a summary review of key concepts. Nonetheless, system constitutes Paul's strategic and integrating conceptual model. His <sup>notion of</sup> system is manifest if, following Riley (1963:10-11), we adopt a minimal definition of system as (1) an entity that is (2) made up of identifiable parts, which are (3) mutually interdependent, so that each part tends to influence and be influenced by other parts, and (4) together the several parts and their interrelationships form the system as a whole. Two of Paul's integrative and interpretive statements illustrate the focus on system and system change.

*The habits and beliefs of people in a given community are not separate items in a series but elements of a cultural system. The elements are not all equally integrated, however; some are central to the system, others peripheral. Hence, some cultural elements can be altered or replaced with little effort, others only by applying great force (1955:15).*

*One way to learn what a particular organ contributes to the functioning of the whole organic system is to see what happens when that organ is altered or removed. The same method applies in the study of social systems (1955:325).*

Paul departs from Ackerknecht not in rejecting the latter's ideas but in taking them a step further. He does so by posing a set of questions that Ackerknecht had never addressed. If we view culture as a system and the medical pattern as one of

its subsystems, what happens to the system and subsystem when they are disturbed, that is when new health-related elements are introduced? Further, what happens to newly introduced elements in the context of a given sociocultural system?

Two propositions are fundamental to Paul's approach:

1. The responses of a given sociocultural (and medical) system to the introduction of new elements are to be explained not solely by the nature of the system nor by the nature and mode of introduction of new elements, but by the complex interaction of both.

2. Reciprocal or feedback processes occur. The introduction of new health-related elements can be expected to affect the host sociocultural (and medical) system. In turn, the latter will also affect (shape or reinterpret) the new elements.

Figure 4 below embodies Paul's primary variables and basic propositions.

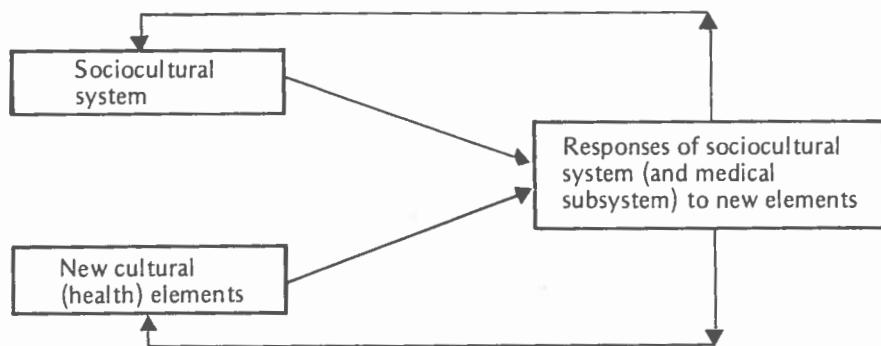


Figure 4. Paul's Model of System and System Change

In at least two respects, Paul's model represents an important departure from the outlooks of Rivers, Clements, and Ackerknecht. For one, conceptual limitations in the models of his predecessors restrict medical-anthropological inquiry to traditional or relatively simple societies. In contrast, Paul's system model removes this constraint and permits the medical systems of modern or complex communities to be as appropriate for study as those of traditional groups. For another, despite differences in theoretical orientation, his three predecessors are similar in that they employ essentially static models—they dissect native medical systems at rest. Paul's orientation, on the other hand, requires a dynamic model, one that can deal with the nature and consequences of change.

In one respect, however, Paul's system model retains a significant feature of the orientations of Rivers, Clements, and Ackerknecht. Paul treats culture as though it were essentially a closed system and excludes from his model factors of

biology and environmental pressure. While Paul acknowledges the fact and importance of broader ecological considerations, they are dealt with largely as background, and their interrelationships with social and cultural variables are only lightly explored.

We now turn to the final and most recent theoretical orientation, one that not only incorporates Paul's system approach but comprehends factors of biology and environmental exigency as well.

#### **Ecological Approach with Cultural and Biological Parameters**

Until about the 1960s, theoretical orientations in medical anthropology revolved exclusively around the ideas of scholars closely identified with a single sector of anthropological interest—the social-cultural. However, the expositors of an orientation that developed rapidly during the 1960s are more closely associated with biological rather than with social-cultural anthropology. The approach cannot readily be delineated by reference to a single author. An explicit and vigorous theoretical statement has been offered by Alland (1966, 1970), and notable contributions have been made by Livingstone (1958), Wiesenfeld (1967), Dunn (1968), McCracken (1971), Damon (1975), and others.

The orientation—for convenience let us call it “ecological”—is broadly concerned with dimensions of disease. Disease is often treated as a dependent variable, that is, how do factors of biology, culture, and/or environmental pressure influence the process and distribution of disease? Sometimes, however, disease is treated as an independent variable—what are the sociocultural, including the cognitive, consequences and concomitants of given diseases in particular groups? Anthropologists have given the approach various labels—dynamics of health status, ecology, medical ecology, epidemiology, social epidemiology (see Polgar 1962; Scotch 1963a; Fábrega 1972; Lieban 1973; Colson and Selby 1974). Alland refers to the orientation as “ecological with the focus on cultural and biological parameters” (1966). Its relative newness may be gauged by Scotch's observation, as recently as the early 1960s, that with some exceptions the area of sociocultural aspects of disease has been largely neglected in anthropological research and theory (1963).

The root of the ecological orientation is essentially a “scientific revolution” (see Kuhn 1962) in evolutionary biology that erupted along a broad front of biological disciplines during the 1940s and that laid the necessary theoretical foundations for dealing with human evolution and adaptation as the complex interaction of cultural and biological factors under given environmental conditions. That biological more than social-cultural anthropologists have been centrally associated with the ecological approach in medical anthropology is by no means fortuitous. Because of the nature of the scientific revolution and its understandable consequence, the impact on anthropology was most immediate in the discipline's biological sector.

Until about the 1940s, as Dobzhansky (1951) observes, each biological science tended to produce ideas and conclusions about evolution that were distinct from and often inconsistent with those of other biological fields. Although

workers from genetics, systematics, embryology, comparative anatomy, ecology, paleontology, zoology, botany, and other disciplines were interested in evolutionary problems, they had neither a common language nor many shared planes of discourse. Work in evolutionary biology tended to follow three primary lines, each involving a different and seemingly incompatible theoretical orientation: natural selection, Mendelian genetics, and mutation.

By the early 1940s, it became evident to a growing number and variety of biological scholars that the three orientations and a host of separate developments among many biological fields were not only compatible but could shed more light on evolutionary processes in combination than was possible for any one approach or field alone. With relative suddenness during the decade, the scientific revolution occurred, that is, the three orientations were synthesized into a theory of evolution.

The theory proceeds on the proposition that populations—not genes, individual organisms, or species—are the basic units of evolutionary change, and it relies on the statistics of population dynamics as a primary tool for the study of evolutionary processes. The theory might be briefly stated as follows. Any population has a pool of hereditary characteristics and exists in an environment. Hereditary variation in the population is produced by two means. One is genetic combination and recombination essentially according to Mendelian laws of inheritance. The other is mutation, especially of the small and virtually imperceptible variety. The keystone evolutionary process is Darwinian natural selection, in which environmental exigencies result in differential selection of a population's hereditary characteristics, promoting or conferring advantage on some at the expense of others. No one of the processes singly is the cause of evolution; rather, evolution proceeds by the intricate interaction and complementarity of all three.

Within the broad framework of this theory humans are seen as evolutionarily unique, utilizing and transmitting culture as a prime and highly efficient instrument for adapting to and controlling their environments. Fundamentally, however, human adaptation, always with reference to given environmental parameters, is a mutually interactive cultural and biological process. Man changes his environment through culture. This changed environment then acts as a selective agent on man's physical structure as well as on his behavior (Alland 1970). Alland presents a general statement of the interrelatedness of culture, biology, environment, and disease in the adaptive process:

*In general, the incidence of disease is related to genetic and nongenetic factors. Any change in a behavioral system is likely to have medical consequences, some of which will produce changes in the genetic system. On the other hand, disease-induced changes in the genetic structure can affect the behavioral system. Such effects may be the result of population restructuring or the emergence of new immunological patterns which alter the possibilities for niche exploitation. In addition, induced or natural alterations in the environmental field provide new selective pressures relating to health and disease which must be met through a combination of somatic and nonsomatic adaptations (1970:49-50).*

The ecological orientation conceptualizes health and disease, more or less in Lieban's terms, as "measures of the effectiveness with which human groups, combining biological and cultural resources, adapt to their environments" (1973:1031). The model also views health and disease as they affect culture and biology and as they respond to the environment.

Figure 5 is a highly generalized depiction of the ecological model. It does not describe any one piece of research with any specificity but attempts to set forth the broad and generic framework underlying much recent medical-anthropological research within the ecological approach.

The position of the box marked "medical system" in figure 5 varies with cultural evolution. In primitive and technologically simple societies past and present, medical theories and specific therapeutic procedures had and have less direct impact on the control of disease than those customs and behaviors outside the medical system, which serve to prevent or minimize disease through positive feedback from the environment (*see* Alland, 1970). However, among populations that possess advanced technology, full-time health practitioners, and a more or less systematic body of codified medical knowledge, the medical system comes to play an increasingly independent and significant therapeutic and preventive role in the total adaptive picture.

As noted, in medical anthropology empirical research utilizing the ecological approach was first contributed by workers with primary interests in biological problems and human evolution. Thus, Livingstone's classic study (1958) relates the distribution of the sickle-cell trait in West Africa to factors of cultural and biological evolution and their interplay under given environmental conditions. He attempts to account for the trait's different frequencies by recourse to the operation of multiple and interrelated variables: diffusion of new technology and crops, modification of tropical forest habitats, population increase, spread of malarial mosquitoes, and effects of malaria on populations and of the sickle-cell gene on malaria.

Subsequently, Wiesenfeld (1967) refines Livingstone's findings. Analyzing data from sixty societies in both East and West Africa, Wiesenfeld finds that the particular type of agricultural system significantly affects rates of the sickle-cell trait and of malaria. Specifically, he reports that reliance on the root and tree crops that go with the "Malaysian agricultural complex" (Murdock, 1959) creates a more malarious environment, leading to selective advantage for individuals with the sickle-cell trait and to changes in the population's gene pool over time. Wiesenfeld presents a hypothesis of biology and culture interacting together in a stepwise fashion. That is, given the intensely malarious environment and the given agricultural innovation, biological change in the gene pool helps maintain the cultural change that had previously led to the new cellular environmental change. The biological change allows further development of the cultural adaptation, and the latter in turn increases the selective pressure to maintain the biological change.

Dunn (1968) combines limited data with reasoned speculation about morbidity and mortality in relation to the ecology of hunter-gatherer life and raises significant issues regarding diseases as agents of natural selection and as dependent

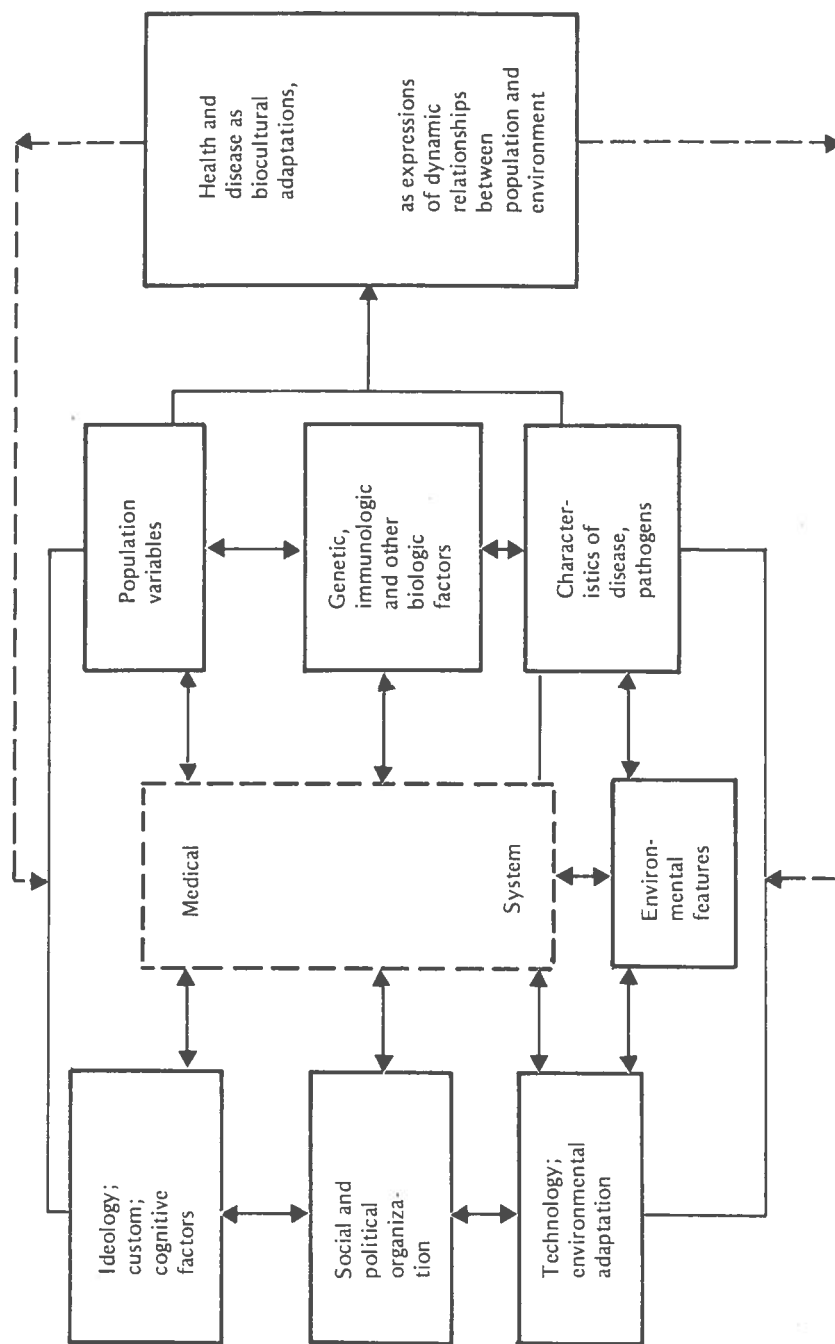


Figure 5. Ecological Model with Cultural and Biological Parameters

and independent variables affecting population size and stability.

McCracken (1971) recasts in broad ecological terms a problem that anthropologists had formerly defined solely as one of cultural conditioning: the fact that some peoples have an aversion to milk. Testing the hypothesis that disliking milk is not simply a cultural but a biocultural trait, McCracken attempts to explain differentials in the worldwide distribution of lactase deficiency (or lactose intolerance). He postulates that lactase deficiency was the normal and universal adult condition prior to animal domestication and dairying and that the introduction of lactose into adult diets in certain cultures generated selective pressures among the populations concerned, favoring the genotype for adult lactose tolerance. To be sure, McCracken's evidence supports the notion that the long-term experience of populations with the production and consumption of milk is closely related to lactase deficiency rates. However, confirmation of McCracken's genetic hypothesis is still an open question. In any event, McCracken's effort to relate cultural evolution and cultural practices to the distribution of a biological trait is a provocative example of ecologically framed research on the interrelationships between cultural and biological variables.

In addition to medical-anthropological research related to evolutionary or diachronic issues, increasing attention is also being given to synchronic, cross-sectional, and contemporary problems within broad biocultural frameworks. Fabrega (1972) and Colson and Selby (1974) review some of the latter work, and Montgomery (1973) provides a succinct summary of recent research on ecological aspects of health and disease in local populations. Indeed, Montgomery's review indicates that the two things Bates (1953) called for more than twenty years ago—greater emphasis on the study of disease as an environmental factor influencing human development and the combining of medical and anthropological interests in single investigators or working teams—are now occurring. Other recent examples of this combining of interests are the studies of Boyden (1970) and Bahnson et al. (1974), in which medical workers and anthropologists (and other social scientists) deal with the interplay between disease and culture within broadly similar ecological frameworks.

Significantly, the broad ecological approach brings the single trait back into medical anthropology for the first time since Clements's work in the 1930s. Ackerknecht had argued forcefully in the 1940s that single traits have no meaning outside the context of their organization and patterning into larger wholes. Within the terms of his cultural-pattern-and-configuration model, Ackerknecht was right. However, modern workers—for example, Livingstone, Wiesenfeld, McCracken, Gadusek (1963), and others—have been finding it conceptually and methodologically advantageous to focus on the frequencies and distributions of specific biological traits, relating them to more or less specific cultural practices and usages, always within the framework of broad ecological models.

It will be of great interest to observe how the combining of cultural and biological variables develops in medical anthropology in the years to come. Several workers view the prospects as highly promising. Alland contends that, given the



broad ecological approach, medical anthropology is a major link between physical and cultural anthropology. Katz and Wallace predict that "biological and cultural anthropologists will soon deal with problems of behavior and disease in the same ecological framework . . . [involving the] . . . interactions of biology, the socio-cultural system, the environment [living and nonliving], and population size and structure as continuously interacting and essential variables with various degrees of independence and dependence" (1974).

### Discussion

There have been both continuities and shifts in theoretical orientations in medical anthropology over the past half-century. As noted, the common point of departure for the field over the years has consisted of three empirical generalizations: (1) the universality of disease as part of the human condition, (2) the fact that all human groups develop methods and roles for coping with disease, and (3) the fact that all human groups develop beliefs and perceptions for cognizing disease. All three have been recognized for a long time, but until relatively recently only the second and third generalizations—those dealing with sociocultural dimensions—have provided the subject matter for research. The first—involving biological parameters—has been held constant and thereby excluded from the purview of medical-anthropological study.

Thus, Rivers, before 1920, employed cultural practices or methods as his dependent variable and sought to explain the latter as a function of either magical or religious belief. Clements, in the early 1930s, focused on certain cultural beliefs—primitive concepts of disease causation—and, treating them as isolated culture traits, endeavored to chart their spatial distributions and relative time sequences. Ackerknecht, largely in the 1940s, built on Rivers's work by conceiving both belief and practice as components of a people's medical pattern and attempted to account for the latter in terms of its functional and historical linkages with the larger culture.

Although Ackerknecht's theoretical contribution dwarfed those of his predecessors, the orientations of Rivers, Clements, and Ackerknecht shared certain important similarities. Each of the three viewed primitive and modern medicine in dichotomous terms, conceived the former as essentially magical or religious, focused on it to the virtual exclusion of modern or "rational" medicine, and dealt with it in conceptually static terms.

Paul's model, in the 1950s, ignored the work of Clements but represented both continuity with and departure from the approaches of Rivers and Ackerknecht. Paul proceeded cumulatively from Rivers's contribution by viewing health-related belief and practice as part of culture, and he also utilized Ackerknecht's postulates regarding the cultural patterning of medical elements and their functional interrelationships with other parts of the cultural totality. However, he diverged from his predecessors in accommodating their approaches to a system model and was thereby able to eliminate the conceptual gulf between primitive and

modern medicine and to deal with problems of change. At the same time, Paul followed earlier workers in holding factors of biology and environmental exigency relatively constant and in limiting his parameters to cultural variables.

The final orientation reviewed here, an ecological approach involving cultural and biological parameters, differs from previous orientations in several respects. Whereas earlier approaches were derived from concepts in social-cultural anthropology and the social sciences, the ecological model by contrast owes its basic lineaments to revolutionary theoretical syntheses in the biological sciences, specifically in evolutionary biology. Moreover, the most important initial contributions based on this orientation have been made not by social-cultural anthropologists but by workers interested in biological and human evolutionary problems.

The orientation departs strikingly from previous models in that it comprehends biological variables, viewing health and disease (whether as dependent or independent variables) as expressions of dynamic relationships between populations, their cultures, and their environments. Thus, the scope of the ecological model includes societies and populations, the behavior of human groups and of microbiota, perceptions of the environment and primary environmental features, definitions of disease and disease itself, ethnomedicine (and traditional medical systems) and modern medicine.

At the same time, the ecological orientation enjoys definite continuity with and builds on preceding approaches. It accommodates Rivers's fundamental insight that medical beliefs and practices are part of culture. It even resurrects Clements's use of the single trait as a unit of study and comparison, but on a more viable conceptual and methodological basis. It incorporates Ackerknecht's emphasis on the cultural patterning of medical belief and behavior and the functional interdependence of medicine with other parts of the total culture. It embodies Paul's system approach and interest in change. However, previous insights are accommodated within a new framework. To be sure, cultural variables are seen to count, and to count heavily, but in terms of their interplay with biologic factors in multivariate ecological systems.