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MIDDLE-RANGE THEORY IN ARCHAEOLOGY: A CRITICAL REVIEW OF ORIGINS AND APPLICATIONS

L. Mark Raab and Albert C. Goodyear

The concept of middle-range theory, arising over three decades ago in sociology, is reviewed. The concept was proposed as an approach to theorizing, urging consolidation of high-order theories with low-order empirical studies. The critical elements in such hierarchies are theories of a middle-range of abstraction. However, most current conceptions of "middle-range theory" in archaeology are far more narrowly conceived. Derived primarily from Binford's work, they continue the New Archaeology's attempt to develop a materialist epistemology for archaeology. In this view, principles of site formation processes are nearly synonymous with "middle-range theory." The dangers to theory-building of this approach are outlined. Examples of middle-range theory that expand our capacity for explanation of cultural behavior are presented.

The concept of middle-range theory in archaeology is an increasingly influential one. For example, in their widely read volume, *A History of American Archaeology*, Willey and Sabloff (1980) suggest that middle-range theory may play a major role in the development of theory within our discipline in coming decades. Such well publicized predictions have a way of becoming self-fulfilling prophecies. At this point, critical discussion of the topic is badly needed.

Having apparently introduced the concept of middle-range theory in archaeology several years ago (see Schiffer [1980:377]), we have followed subsequent developments with considerable interest. We proposed (Raab and Goodyear 1973) that middle-range theory might help bring order to theory-building under the spirited but eclectic onslaught of the New Archaeology. In the same vein, we treated the topic briefly (Goodyear et al. 1978:161–162) in connection with difficulties of theory-building in conservation archaeology. In the meantime, several discussions of the subject have appeared, which, in our opinions, are producing considerable confusion.

There is little evidence that archaeologists understand the concept of middle-range theory as that was originally conceived by social science theorists. Those theorists advanced the concept, not as a substantive theory of any particular phenomenon, but rather as middle-range *theorizing*. The essential point was to develop a strategy for integrating research problems and data into cumulative bodies of scientific knowledge in which theories of limited scope, arrayed at different levels of generality, could be subsumed under domains of increasingly general principles. The concept of middle-range theory was thus a part of a larger theory-building enterprise. Archaeological interpretations of middle-range theory have so far been much more narrowly focused. These interpretations result largely from the distinctive logical problems involved in attempting to infer behavior from material traces. At the same time, confusion is compounded by current uses of the term "theory" in archaeology. Any hypothetical statement, regardless of its topic or degree of abstraction, seems to be a candidate for "theory" and exists on the same plane of importance as other ideas. One result of this "flat" view of theory is a tendency to confuse "data language" (cf. Price 1982:711), involved in the operational or methodological detection of data patterning, with ideas about the causes of

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such patterning contained in a "theory language." Current understandings of "middle-range theory" in archaeology encourage such confusion.

This paper's first objective is to examine briefly middle-range theory within its original sociological context. Archaeologists have overlooked this background, thinking perhaps that it would tell them only something about sociological theories. The facts are quite different. One consequence of this oversight is that confusion has followed attempts to assimilate into archaeology what has been called "middle-range theory."

The second objective of the paper is to examine the problems and prospects of such attempts at assimilation. Some of the confusion here is probably semantic, owing to an unfortunate borrowing of the term "middle-range theory" from sociology. Nevertheless, the difficulty goes beyond semantics. At issue is the ability to discriminate between differing research strategies; i.e., whether to emphasize the development of general *methodology* or cultural *theory* of human behavior, be it middle-range or otherwise.

MIDDLE-RANGE THEORY IN SOCIOLOGY

Middle-range theory was integral to major changes in sociological theory following the Second World War. Several works by Parsons (e.g., 1948, 1950, 1951) were of crucial importance. Where previous theory had focused on the individual or groups of individuals, Parsons advanced the structural-functionalist concept of the "social system." This highly abstract entity was conceived as being comprehensible through analysis of statuses, roles, norms, institutions, and other societal "functions." Moreover, Parsons took the position that this research program could proceed from an a priori and over-arching theory of the social system and social action. The strategic objective was to bring social phenomena within the scope of a unified body of theory. If the desired inclusiveness of this scheme necessarily involved construction of highly abstract and generalized concepts that were sometimes difficult to relate to actual research, Parsons and his followers were willing to accept this condition as the price of a unitary theoretical approach (Larson 1973:126-136; Mullins 1973:57-59).

One sociologist, R. K. Merton, was unwilling to adopt such a position. Beginning with an essay in 1948, Merton began development of a theoretical program with the concept of middle-range theory at its core (e.g., Merton [1949] and subsequently in revised editions [1957 and 1968]). A major part of this program was an attempt to counter perceived dangers in Parsons's approach.

Merton sees an all-too-easy separation between theory and empirical studies. Although motivated in part by a concern that grand theorizing may come to little if it cannot be applied to actual research, middle-range theorizing is equally a critique of blind empiricism. On the one hand, Merton notes a tendency to erect grand-scale "models," highly abstract "approaches," and other broadly-conceived conceptual schemes that have little hope of actually being tested:

A large part of what is now described as . . . theory consists of general orientations toward data, suggesting types of variables which theories must somehow take into account, rather than clearly formulated, verifiable statements of relationships between specified variables. We have many concepts but fewer confirmed theories; many points of view, but few theorems; many "approaches" but few arrivals [Merton 1968:52].

Broad theoretical principles are not entirely rejected. Such schemes can provide antidotes to uncontrolled eclecticism. And yet Merton calls for recognition that abstract ideas do not necessarily lead to tested, or even testable, theories.

Conversely, Merton attacks empiricism that fails as "directed," i.e., theoretically-guided, work. Merton (1968:149-150) argues that, "The notion of directed research implies that, in part, empirical inquiry is so organized that if and when empirical uniformities are discovered, they have direct consequences for a theoretic system." This stricture in no way negates the value of empirically-based work. An empirical discovery may be the stroke of serendipity that compels a new theoretical direction (Merton 1968:157). In the long run, however, shotgun empiricism is seen to offer a poor return for systematic theory.

Merton recognized this dilemma between empiricism and theorizing as pervasive in human

behavioral research generally. Accordingly, Merton's (1968:38) stated objective for middle-range theory has been welcome to many:

Middle-range theory is principally used . . . to guide empirical inquiry. It is intermediate to general theories of social systems which are too remote from particular classes of social behavior, organization and change to account for what is observed and to those detailed orderly descriptions of particulars that are not organized at all. Middle-range theory involves abstractions, of course, but they are close enough to observed data to be incorporated in propositions that permit empirical testing.

Middle-range theory is intended to vary in levels of abstraction, to be flexible in seeking sources of working hypotheses, and to be aimed at accumulating a body of theory. The substantive content of research problems obviously varies from one area of inquiry to another, the specificity of these problems varying according to existing data and hypotheses. Despite the fact that particular research problems are more or less broadly conceived, middle-range theory is seen as providing a logical link between relatively low-order empirical generalizations and comparatively high-order theories.

One outcome of middle-range theorizing can be the creation of a logical structure in which low-order working-hypotheses tend to confirm or negate propositions in a middle stratum and the latter in turn reflect upon the validity of yet more generalized theories. From an inductive perspective, one can enter this hierarchy by means of "grounded theory" (cf. Glaser and Strauss 1967) based upon empirical findings. On the other hand, a series of testable propositions can be derived deductively from existing theories in ways suggested by Hempel (1965), Popper (1959), and others. In the Mertonian scheme middle-range theory is the critical *bridge* between theory and data that allows both kinds of operations to be effective. Debates about whether an inductive or deductive approach is "best" are rendered pointless.

Merton's own work as a sociologist reflects the tenets of middle-range theory. One example is his theory of social structure and anomie (Merton 1968:185–214). Briefly, Merton proposed that contemporary American society be conceived as a social system within which there are strongly-held beliefs that individuals should be able to attain wealth, power, and prestige on the basis of their own abilities and accomplishments (upward mobility within a meritocracy). He also suggested that society in fact does not provide the structural means for all or even most people to actually attain such "success." The fundamental consequence is that anomie (normlessness, strain toward social conflict) emerges, caused by a disjunction between culturally valued ends and available means. Merton went on to develop a matrix of predicted responses to this conflict that included such outcomes as criminal behavior, ritualistic conformity to the rules of bureaucracies, rebellion, suicide, and others.

The important point is that Merton attempted to show that a variety of specific social behaviors can be understood in relation to a more general principle. From the middle-range theory perspective, the theory of anomie is a critical link between many specific forms of behavior (criminal acts, suicide, etc.) on the one hand, and certain fundamental social structures on the other hand, of which contemporary American society provides one case. Where the theory of anomie is too generalized to be tested directly, it can be evaluated by seeing how well a series of derived predictions about different and specific behaviors hold up to empirical testing. This is of course a great simplification of this work, but it does show perhaps the logico-empirical objectives of middle-range theory in practice.

While one need not turn to sociology to learn that research should be both theoretically directed and empirically grounded, a look at the history of middle-range theory in sociology shows that the concept has generated both praise and criticism. Even after 30 years of debate about middle-range theory, uncertainty persists about what it is and what its value might be. Merton's assertion that research should be guided by middle-level theories, and such examples of this approach as his theory of anomie, have struck critics (e.g., Larson 1973:138) as too vague. Critics (e.g., Freese) ask how, for example, one obtains such propositions in the first place? At what level of abstraction ought these propositions be aimed? How might insight into various middle-level constructs eventually be melded into unified theory? (Freese 1980a, 1980b:206–207) Proponents of alternative theoretical schools also point out that Merton's structural-functionalist approach represents an ideological bias

which supports the study of systems as static entities, and ignores fundamentally different theoretical approaches to behavior such as exchange theory, symbolic interactionism, Marxian conflict and others (Freese 1980b:206; Larson 1973:140–141). The truly large body of literature commenting on Merton's work (see Coser [1975:516–522] for references) makes evident that his ideas have received both widespread support and criticism.

Nevertheless, Merton's concept of middle-range theory has been a fundamental influence on thinking about social theory. Freese (1980b:206) summarizes the current view of the Parsons-Merton debate, including the middle-range theorizing that is an integral part of it. He suggests that, "this issue is still embedded in the sociological consciousness, though now it has the character of old wine in new bottles." Freese (1980b:206) further suggests that:

The proposal for a comprehensive, unified system of theory for sociology has usually equated the systematic growth of scientific knowledge with consolidation of theory and empirical research. Merton's classic essays on the relation of theory to research . . . supplied the conventional view: The problem was to consolidate sociological knowledge so that theories and data become integrated and special theories converge.

MIDDLE-RANGE THEORY IN ARCHAEOLOGY

How did the term "middle-range theory" find its way into archaeology, and how do its archaeological applications compare with the original sociological objectives? Given the decades of use that the term received in sociology prior to its appearance in archaeology, one might well expect archaeologists to have acknowledged the sociological connection. Curiously, however, such a connection rarely appears in current archaeological literature. Apart from a brief notation of the term's origin in sociology by the present authors (Goodyear et al. 1978:161), we can find no other publication to date that deals with the intellectual history of this term, despite the fact that "middle-range theory" is referenced in several archaeological publications, including a textbook, as well as book-length research reports (see below). For the reader of current literature on "middle-range theory," the term seems to have arisen *de novo* in archaeology.

To a large extent, then, we are forced to provide our own analysis of the processes through which "middle-range theory" has been introduced to archaeology. When compared with the intellectual program advanced by Merton, such an analysis produces revealing results. It should be clear that Merton was urging a certain view of the entire research enterprise. Middle-range theory emphasized careful formulation and testing of theories that could link empirical data with higher-order conceptual schemes. All of this work addressed explanations of variability in social behavior as the immediate and central purpose of theory-building. However, study of "middle-range theory" in many current archaeological publications reveals quite different objectives.

Instead of looking at the fit between theories at various levels of application in archaeology or at the adequacy of such theories as explanations of cultural behavior, "middle-range theory" has tended to become narrowly methodological in character. This is the result of efforts to deal with the archaeological problem of material data.

Principles of site formation processes have become virtually synonymous with "middle-range theory." In our view there are dangers here. One danger is simply that confusion arises once the term "middle-range theory" has been transplanted into archaeology without adequate attention to intellectual history. A more serious problem is that some may believe that pursuit of methodological problems alone necessarily constitutes an exercise in building "theory." That belief is unwarranted, if we mean by theory the conceptual devices by which we seek explanations of cultural behavior.

In order to understand how "middle-range theory" in archaeology has developed such a narrow orientation, it will be necessary to look briefly at aspects of the recent intellectual history of the discipline. We take up that task next. We will then consider current uses of "middle-range theory" in the archaeological literature, and follow this with an examination of dangers that those uses involve for theory-building. Finally, we will present examples of theory-building in archaeology that we believe more nearly conform to the original concept of middle-range theory, and point out why we believe these strategies better serve the needs of archaeology.

The "Archaeological Theory" Precursor to "Middle-Range Theory"

Issues concerning adequate scientific interpretation of the archaeological record constituted a major focus of the New Archaeology in the late 1960s. Although the term New Archaeology may conjure up such issues as improving the role of archaeology as anthropology, the merits of deductive versus inductive reasoning, or the desire to employ more precise and sophisticated analytical techniques, these concerns had been voiced before (Caldwell 1966; Kluckhohn 1940; MacWhite 1956; Taylor 1948; see Willey and Sabloff [1980:185–188]). What was fundamentally new and significant in this movement was the questioning of the entire conceptual structure of archaeology as a science. By this we mean the metaphysical, logical, and procedural assumptions upon which depended conventional means for basing knowledge claims about the past upon the archaeological record.

Binford's work was perhaps the single most influential element of this movement. Binford (1968a, 1968b) was as much concerned with the scientific adequacy of archaeology as he was with archaeology's contribution to anthropology's broader goals. Indeed, the Binfords argued (1968:2) that there would be no significant contributions to anthropology's goals until the scientific adequacy of archaeology was improved. The methodological issue of adequately warranted inferences from the archaeological record, and the connection between this logic and the higher goal of explaining cultural processes, were variously described by Binford and his students as "arguments of relevance," "bridging arguments," and "archaeological theory" (Binford 1968a; Binford and Binford 1968:2; Fritz 1968; Fritz and Plog 1970). A clear statement of the nature of what came to be called *archaeological theory* is given by the Binfords and well expresses their concerns about epistemological adequacy:

Archaeological theory consists of propositions and assumptions regarding the archaeological record itself—its origins, its sources of variability, the determinants of differences and similarities in the formal, spatial, and temporal characteristics of artifacts and features and their interrelationships [Binford and Binford 1968: 2].

It is important to realize the great extent to which the practitioners of the New Archaeology named above were concerned with the issue of scientific adequacy with regard to material remains and the development of data languages for dealing with them. That concern may well be one of the most important intellectual legacies of the New Archaeology. The tenets of this approach may be summarized as follows: The archaeological record is a contemporary phenomenon in which it is not possible to experience the past *directly* but only *indirectly* by means of appropriate instruments (Binford 1968b, 1981b; Fritz 1972). Consequently, archaeological remains entail no inherent or objective meanings, but receive only those meanings supplied by contemporary observers (Binford 1968a; Hill 1972). One must, therefore, differentiate a past dynamic or systemic context (Schiffer 1972) of events from the presently observable, or static, archaeological context. Once this distinction has been made, concepts for accurately translating statics into dynamics can be identified. To effect such translations, the behavioral and natural processes responsible for the material record must be securely identified in order to build a structure of inference (Binford and Binford 1968:2; Fritz 1972; Reid et al. 1975; Schiffer 1972). Moreover, any such principles of translation, in order to provide reliable knowledge, must be covered by law-like propositions and be based upon uniformitarian assumptions (Binford 1968a; Watson et al. 1971; Watson 1976; see Sullivan [1978] for a review of these ideas).

The importance of these developments is that they are very much a prologue to present problems with "middle-range theory." Turning to the present literature, it becomes evident that what Binford currently describes as "middle-range theory" is no more than the methodological domain formerly described as "archaeological theory;" the modifier "archaeological" again refers to the intellectual program intended to deal with the problem of material data. In our view, however, nothing has been gained by a change of labels, except perhaps confusion.

"Middle-Range Theory" in the Current Literature

To the best of our knowledge, the phrase "middle-range theory" was initially introduced into the published literature of archaeology by Binford in his introduction to *For Theory Building in Ar-*

chaecology (1977a:1–10). Although it was never formally defined by him in that or subsequent works, several passages may be quoted that present a good idea of what Binford intended by “middle-range theory”:

There are urgent needs for theory building on at least two levels. One level is what I refer to as *middle-range theory*. If one accepts observations made on the archaeological record as contemporary facts along with the idea that such facts are static, then clearly basic problems for the archaeologist include (a) how we get from contemporary facts to statements about the past, and (b) how we convert the observationally static facts of the archaeological record to statements of dynamics [Binford 1977a:6].

From these circumstances, Binford (1977a:7) concludes that, “we must develop ideas and theories (middle-range theory) regarding the formation processes of the archaeological record. Only through an accurate understanding of such processes can we reliably give meaning to the facts that appear, from the past, in the contemporary era.”

The concept of archaeological “middle-range theory” was further developed by Binford (1981a) in a book-length treatment of the subject, which specifically addressed problems in the general methodology of faunal analysis. There, he refers to this form of analysis as “middle-range research” and “middle-range theory building.” In a footnote (Binford 1981a:25), he indicates that these expressions are, in essence, what David Clarke (1973:8) referred to as “interpretative theory,” and they apparently also equate with “behavioral archaeology” as proposed by Michael Schiffer (1976). Again, although he does not provide formal definitions, Binford (1981a:25) specifies what is desired from the conduct of “middle-range research”:

accurate means of identification, and good instruments for measuring specified properties of past cultural systems. We are seeking reliable cognitive devices; we are looking for “Rosetta stones” that permit the accurate conversion from observation on statics to statements about dynamics. We are seeking to build a paradigmatic frame of reference for giving meaning to selected characteristics of the archaeological record through a theoretically grounded body of research, rather than accepting folk knowledge—let alone implicit folk knowledge—as the basis for describing the past.

Note that Binford (1977a, 1981a) is careful to distinguish “middle-range theory” from “general theory.” Although he has never discussed the structure of general theory in detail in any of his writings, he uses it to refer to concepts about why cultural systems were organized as they were (or are), and why they changed from one organizational state to another. For Binford, middle-range theory is apparently intended to provide logico-empirical bridges between the static phenomena evident in the contemporary archaeological record and the behavioral dynamics that are inferred to have produced those phenomena. But those dynamics do not encompass larger questions about the causes of change or stability in cultural systems. The objective in the 1981 volume, Binford’s most extended treatment to date of “middle-range theory,” is to create a kind of data language for determining in which cases faunal remains may accurately be said to be the product of natural biophysical forces or the result of human manipulation. When set against the larger goal of explaining cultural dynamics, Binford’s promulgation of “middle-range theory” is clearly *methodological* in character because it allows archaeologists to deal with material records but not necessarily with problems of cultural dynamism. Binford is not at all confused about this distinction. He views his work with faunal materials as a necessary step toward testing anthropological, i.e., cultural, theories. Unfortunately, the matter does not end there. Others have apparently gained the impression that “middle-range theory” is equatable with principles of site formation processes, and that such an equation can somehow constitute an adequate “theoretical” program for archaeology.

Thomas (1979), for instance, following Binford’s (1977a) notion of middle-range theory, soon introduced this phrase in several places in a textbook on archaeology. There, “mid-range theory” was presented as bridging arguments between the static properties of the archaeological record and the interpretations of past dynamics by archaeologists. Thomas writes that, “The function of mid-range theory or bridging arguments is to bridge the gap between the known, observable archaeological contexts and the unknown, unobservable systemic context. This is why mid-range theory is necessary to provide relevance and meaning to archaeological objects” (Thomas 1979:398).

The idea that “middle-range theory” deals with statics, dynamics, and site formation processes,

all points made by Binford, opened the door to further ambiguity. Indeed, the connection of “middle-range theory” with the concept of site formation processes probably created an all but irresistible tendency to see the two concepts as synonymous. Concern with developing an adequate materialist epistemology for archaeology is widely identified in the current literature with Schiffer’s (1972, 1976, 1977) concept of site formation processes. Recast in the role of Schifferian “behavioral archaeology,” “mid-range theory” as conceived by Thomas may strike some as a plausible and appealing link between the static record and once-dynamic events. We should note, however, that Schiffer (1976) clearly intended behavioral archaeology to be a general methodological program, and in none of his writings has he seen fit to call it “middle-range theory.” The idea of site formation processes was for Schiffer (1972:156) a branch of archaeological theory, but he has continued to view the former as a methodological domain (Schiffer 1983). There seems to be little advantage in offering “mid-range theory” as a new designation for principles of site formation processes, and thereby creating the impression that something new in the way of theory building is at hand.

Later, in a discussion of “middle-range theory,” Willey and Sabloff, (1980:249–254) proposed arguments that are compatible to some extent with those of both Thomas and Binford. Willey and Sabloff conceive of archaeological reasoning as consisting of lower, middle, and upper levels of theory (Willey and Sabloff 1980:249). Upper-level theory is to them apparently the same as “general theory”—i.e., highly abstract explanations of the behavior of whole cultural systems. The various “c-” and “n-transforms” of Schiffer’s (1976) behavioral archaeology are regarded as “lower-level theory.” Examples are inferences that rely on law-like statements concerning the possible relations that shape, size, and so forth may have to the spatial distributions of objects within an archaeological site. A specific illustration of such a relationship is provided by the “size effect” (Baker 1978), which shows how the size of an artifact affects the probability of its being exposed, and hence recognized, on the surface of the ground. General arguments of this sort, usually rooted in physical and biological principles, *partially* explain the form, content, and distribution of the archaeological record.

For their “middle-level theory,” Willey and Sabloff adopt Binford’s (1977a) view that such theory serves as a bridge between the static facts of the archaeological record, and the behavior that produced them: “In other words, not only must archaeologists learn *how* the archaeological record was formed (an exercise on the lower theoretical level of transformation processes), but they must be able to explain *why* a dynamic system of the past produced the static archaeological record of today (the middle-range theoretical exercise in the assignment of meaning)” (Willey and Sabloff 1980:250–251). They go on to say that “middle-range” refers only to this bridging function and that nothing is implied about the scale or scope of such “theories” (Willey and Sabloff 1980:251): “Middle-range theories can vary from very specific, particularistic statements to quite broad ones with general significance, depending on the kinds of building blocks the archaeologist needs to formulate and test general archaeological hypotheses.”

Despite the attempt by Willey and Sabloff to define a coherent hierarchy of theory-building, their scheme contains problems. It is difficult to see significant differences between so-called lower-level theory and middle-level constructs. They adopt Binford’s view that middle-level constructs ought to provide bridges between statics and dynamics. The implication is that these constructs somehow exist on a higher theoretical level than the lower-level site formation principles. As we have seen, however, Binford’s work embraces the “lower-level” constructs as methodological devices for transforming statics to dynamics. In reality, Willey and Sabloff’s “lower-level theory” and “middle-level theory” both seem to refer to the central methodological problem of dealing with material traces. It is not clear, however, by what means theory enters their hierarchy in order to answer questions about cultural behavior, except perhaps at the most highly abstract levels of “general theory.” On close inspection their scheme is actually polarized between limited and concrete questions of formation principles at one end and highly abstract theories at the other.

Finally, our published discussion of “middle-range theory” (Goodyear et al. 1978:161) was meant to be Mertonian in character, and stands in contrast to all of the previous treatments. In our discussion we tried to emphasize development of an axiomatic body of theory; i.e., hierarchically linked theories of differing scales and comprehensiveness that could be made eventually to converge with more general principles. Our intent was to invite thinking about theory in this “vertical” mode. We were

less concerned with operational or methodological considerations, believing that beyond methodology, archaeologists face a challenge in developing a more ordered universe of theoretical constructs if they are to move away from the "flat" view of theory we mentioned earlier. Presented only sketchily, and with brief mention of intellectual antecedents, our discussion of "middle-range theory" probably shares in any blame to be assigned for creating ambiguity about this concept.

Potential Problems of "Middle-Range Theory" in Archaeology

We hope that the differences between the original conception of middle-range theorizing and the conception of "middle-range theory" in most current archaeological discourses are now apparent, at least in broad outline. We have attempted to show that while middle-range theory was a heuristic principle that sought to organize a complete and dynamic program of theory-building, archaeological uses of the term have, for the most part, focused on the methodological problems of dealing with material data. Our objection to this application in archaeology is not at all founded on rejection of the search for methodological adequacy. Archaeologists do face distinctive, if not unique, problems in advancing behavioral research on the basis of material traces. It is absolutely vital that we deal with this problem. The search for solutions to it has been underway for nearly two decades, however, under a number of headings, such as "archaeological theory" and "principles of site formation processes." Again, we see no advantage in now calling such efforts "middle-range theory." But there is a much more serious problem involved in restricting the concept of middle-range theory to methodological concerns. Archaeologists need both a more expansive and more organized view of theory-building. A narrow focus on methodology will do little to encourage such development if archaeologists become convinced that "middle-range theory," as presently construed, constitutes an adequate approach to theory-building in its own right. This problem is particularly acute if principles of site formation processes are held to be synonymous with "middle-range theory." One of us (Goodyear 1977:670) noted the potentially deadening influence of formation principles when he pointed out that, "It is physically and mentally impossible to study *all* relationships, since most of them are probably trivial and theoretically uninteresting. Without significant questions and problems, behavioral archaeology has a tendency to turn into mechanical archaeology." More recently, Price (1982:714) makes a similar point, but about the logical dependence of methodological tools on true theory:

In ethnography . . . behavior can be observed directly, while in archaeology much behavior must be reconstructed, indirectly, from its still observable consequences. If such a step mandates consistent procedures of its own, it does not follow that these operations constitute theory above the very lowest level, if that. The principle of hierarchy in theory-building indicates that any such procedures are themselves directed and their applications guided by middle-level and higher-level theory, however implicit; the former do not substitute for the latter.

What middle-range theory might look like in archaeology has been obscured by problems with theory in general. There seems to be confusion over the concepts of *generality* and *comprehensiveness* in developing theories. One can readily appreciate that a theory is general by definition when it specifies a set of conditions under which some phenomenon will occur. At the same time, one is interested in estimating the comprehensiveness of the theory in question—a factor reflected in the number of phenomena it is able to predict. This is where we return to our earlier comment on Willey and Sabloff's (1980:250–251) three levels of theory-building. We argued that their classification, in effect, dichotomized types of theories into quite high-order ones on the one hand and ideas about dealing with material records on the other. The examples they give of "middle-level" and "lower-level" theory in fact both deal with the latter. Willey and Sabloff's scheme is instructive because it may reflect the underdeveloped sense of theory as consisting of partitive constructs that serve to link methodology with high-order principles.

There is a kind of all-or-nothing view of theory at work here. Both the so-called low-level and high-level theories are made to carry enormous burdens of generality and comprehensiveness. In the former, for instance, the artifact size-effect principle mentioned earlier is intended to be lawlike and applicable to a great many, if not all, archaeological cases. Similarly, theories of the rise of the

state, an example of high-level theory, are thought to be highly general and comprehensive within the domain of their applicability. What strikes one here is the theoretical void between these extremes. In a sense this is the “flat” view of theory mentioned earlier. We tend to see all conceptual ideas as having the same burdens of generality and comprehensiveness, and this view of theory exacts a price. The extreme separation of methodological ideas from ideas about variability in cultural systems, when coupled with the tacit expectation that ideas at both ends of the spectrum can carry the whole burden of establishing scientific principles, results in research where methodology cannot be connected very well with the discipline’s most fundamental theories. There is, in addition, the frustration of attempting to test ideas that are so generalized that we joke about them as being “Mickey Mouse” or lost in the “ozone.”

We recognize that in actual research method and theory are intimately linked. Separation between the two, however, is an interesting gray area thus far only hinted at in the literature (Goodyear 1977; Willey and Sabloff 1980:250–252). There is an interesting difficulty here in our conflicting knowledge claims about *how* and *why* the archaeological record comes to exist. Willey and Sabloff (1980:250) liken questions of *how* the record was formed to “lower-level theory,” for instance. Their idea is that, by means of appropriate methodological tools, we can understand the formation processes of the record, and can eventually assign certain types of behavior securely to certain physical remains. This seems to be a process of identification. At some point, however, behavioral scientists would like to know *why* the behaviors in question came to be. This constitutes a search for explanations of cultural behavior. It is not always clear, however, at what point questions about behavior leave the realm of formation processes and assume the role of cultural theory. In actual research the transition from one to the other is likely to be seamless, for the process of creative research consists of intuitive transitions back and forth between methodology and theory. This observation is worth remembering, because certain research strategies are unlikely to sustain such creativity.

Roughly speaking, when we cease to ask merely what kinds of behaviors can be linked to certain records and start to ask why the behaviors in question came into existence, changed, or remained stable, we approach meaningful theory-building. To date, most treatments of site formation processes have been carried out at a mechanical level and easily related to principles already extant in biology and the physical sciences (e.g., Binford and Bertram 1977; Wood and Johnson 1978). Such studies have the great value of stripping away both patterning and “noise” in the archaeological record that are not the result of human behavior, and perhaps even implicating behaviors that do correlate with some kinds of records (e.g., Binford 1979, 1981b). But if we equate formation principles with “middle-range theory,” then we must agree with Binford (1981a:29) that, “middle-range theory plays no role in the *explanations* offered for the variability of the subject of interest.”

The point here concerns the possible relationship between methodological adequacy—what we have referred to interchangeably as formation principles and archaeological theory—and true theory-building. It would be a misunderstanding to think that the two are in some way incompatible. It seems more likely that little progress will be made toward archaeological explanation until both areas are considerably more advanced than at present. Even more importantly, progress toward developing adequate forms of explanation depends upon a close integration of method and theory. At the moment, discussions of “middle-range theory” seem to be obscuring that point, owing to the semantic confusion surrounding the term in archaeology.

MIDDLE-RANGE THEORY AS EXPLANATION OF CULTURAL SYSTEMS

Despite the problems outlined above, there should not be undue pessimism about prospects for developing middle-range theory in archaeology. Brief examples drawn from current research may illustrate not only some plausible approaches to middle-range theorizing but also applications of such theory to quite different subject matters.

Good examples are the alternative theoretical models of hunter-gatherer settlement behavior offered by Wiessner and Binford, respectively. Both seek to explain organizational variability in modern and prehistoric groups. Binford (1977b, 1978, 1980) has chosen to order variation in settlement behavior by emphasizing the availability in time and space of target natural resources

that are ultimately determined by geographic and climatic variables. He describes this as a theory of adaptation (Binford 1980). Wiessner, on the other hand, argues that this approach is insufficient to account for "social relations of production" (Wiessner 1982). She offers an alternative framework called "risk theory," which is said to hold greater potential for explaining more kinds of human behavior, such as camp layout, exchange, style, and burial programs.

Binford (1980) is able to explain some of the organizational patterning based on environmental variables, while Wiessner is potentially able to explain some of the same data, as well as other patterns, based on risk theory analysis of social strategies. At this point, neither approach is capable of explaining all aspects of hunter-gatherer behavior that are of interest to anthropologists. Both examples can be thought of as middle-range theoretical approaches because they possess causal or potentially causal statements about *aspects* (exchange, social organization, logistics systems, etc.) of hunter-gatherer cultural systems that can be explored empirically, using archaeological remains. Yet, from these provisional and partial treatments we may eventually expect an amalgamation of "special" theories into a yet more comprehensive theory that explains all of these behaviors and perhaps goes beyond them. This is the process of theory-building as envisioned by Merton in his concept of middle-range theory. It is provisional, testable, relative in the scale of phenomena to be explained, axiomatic in that one hypothesis, principle, or model can be subsumed under another, aimed at explaining cultural behavior and, above all, dynamic.

Another promising area of middle-range theory development takes up the question of the origin of social complexity, or socioeconomically stratified societies. Unlike the theory-building in the case of hunter-gatherers, however, which seems to have developed from a "grounded" perspective in archaeological data, the problem of social complexity has been approached from a more "deductive" position. The impetus behind this work seems to lie in highly abstract models derived from engineering and physics. Shortly after the Second World War, physical scientists became interested in the theoretical and practical problems involved in storage, and transmission of information within communication systems. Some of that work, for instance, was concerned with artificial intelligence and cybernetic systems (Wiener 1967), while other parts focused on the mathematical properties of information transmission (Shannon and Weaver 1949). One of the more important consequences of this work was widespread appreciation of a "cybernetic" or "systems" approach, in which explanations of phenomena in various scientific fields were couched in terms of understanding how a system functions by means of communication between its constituent parts. Highly abstract, yet offering a useful holistic perspective, this basic concept eventually diffused to many areas of research, including anthropology.

Social scientists were quick to realize the potential applications of this construct to problems of human behavior. Of particular interest were possible relationships between the complexity of social organization and the structure of communications or interactions within parts of social systems. More specifically, investigators in several disciplines became convinced that social organizations tend to be structured by the fashion in which information is exchanged. In other words, the complexity of social organization attainable by a social system is dependent upon its ability to maintain orderly communication between its constituent parts (e.g., Beer 1967; Dubin 1959).

These brief statements scarcely survey the extent of this pan-social-science body of theory, but they have provided a broad theoretical foundation for recent archaeological efforts to explain the rise of complex societies. Although these efforts have several labels, perhaps the most useful one is "hierarchy theory" (following Peebles and Kus [1977] and Johnson [1979]). These archaeologists argue that some cultures eventually encounter both environmental and social conditions that reward a shift from loosely structured "horizontal" systems of communication and control to more efficient "hierarchical" ones (cf. Flannery 1972).

Peebles and Kus (1977), for example, present a "cybernetics model of chiefdoms" aimed at demonstrating that Mississippian sites in the Moundville, Alabama area are the expression of ranked, or hierarchically organized, cultures. Although part of this discussion questions the linkage of ethnographic models of chiefdoms with economic redistribution mechanisms, a major part of their conceptual base (1977:428-429) draws upon cybernetics and information theory. The thrust of these

arguments is that the power and ritual offices of the chief can be viewed as a controlling node in a two-tiered hierarchical system. The adaptive advantage of such a system, according to cybernetics and information theory, would be the greater efficiency of information processing and decision making over that of an egalitarian society.

Wright and Johnson (1975) provide another informative case. These authors are concerned with early state formation in southwestern Iran, during which a formal administrative hierarchy developed. What is not known is how and why administrative controls shifted from local communities to semi-autonomous offices in a developmental progression that ultimately culminated in the emergence of a bureaucratic hierarchy within a state-level society. They hold the general theory that a shift toward a hierarchically organized system was encouraged by gains in information processing and decision making (Wright and Johnson 1975:285). These are some of the same theoretical points made by Peebles and Kus (1977).

Wright and Johnson combine information theoretics with concern for other variables operating in Greater Mesopotamia such as trade, war, and economy and they implicate the increased efficiency of control hierarchies in the creation of new organizational relationships among those variables. Incidentally, they note that traditional attempts to account for the rise of the state by single "prime mover" theories can be avoided in favor of more productive multivariate models.

What is interesting about these cases is that a general theoretical argument has been converted into a series of derivative propositions regarding a variety of archaeological phenomena, including mortuary practices, trade and political offices. These works create a body of middle-range constructs in archaeology that serve as stimulus to the development of new theories, while posing the question whether a more abstract principle may not subsume all of these efforts. This is nothing less than an invitation to think in terms of axiomatic theory; i.e., about the logical and empirical consequences of an hierarchic system of theories dealing with many otherwise disparate data.

CONCLUSIONS

In its original sociological context, middle-range theory was advanced as a basis for theorizing about the causes of human social behavior. It was advanced by Merton to counter a tendency for social science research to split into high-level but untestable theorizing on the one hand, and low-level empirical studies detached from theory on the other. Productive research was conceived as being empirically based, but moving through a hierarchy of propositions, which existed at a middle-range of abstraction and provided a crucial linkage between data collection and higher-order theories. Merton's theory of social-structural anomie provided an example.

In sharp contrast, most current usages of "middle-range theory" in archaeology are far more narrowly focused on the methodological issue of site formation processes. This emphasis in fact continues the development of a materialist epistemology for archaeology begun by certain practitioners of the New Archaeology, most notably Binford. The fundamental objective of such an epistemology is to ground inferences about past human behaviors by developing a reliable methodology for differentiating the effects of behavior from the many other causes of the material record.

Objection was raised to the characterization of operations of this sort as "theory." Statements about site formation processes are *methodological* in that they allow detection of patterning in human behavior. Such tools may work well in conjunction with ideas about the causes of behavioral patterning. Principles of site formation processes, taken by themselves, often lead to "explanations" that are trivial or easily reduced to simple biophysical principles. However successful in accounting for the form of the archaeological record, site formation principles do not tell us how the record came to exist as a result of the behavior of cultural systems. Explanations of the latter kind will require formulation and testing of propositions aimed at explaining cultural dynamism.

In a scientific field operating within a largely unorganized universe of theoretical ideas, development of middle-range theory may provide a useful perspective for looking at the perennial problem of theory-building. We argued that some theory construction of a middle-range sort is already underway in archaeology. The examples presented, ranging topically from hunter settlement-sub-

sistence to the rise of complex societies, may show that *middle-range theorizing* is an approach that is not bound by any particular subject matter. Equally important, the cases cited attempt to explain not merely the archaeological record, but the cultural dynamism responsible for that record.

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