



# BONES

ANCIENT MEN  
AND  
MODERN MYTHS

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**Lewis R. Binford** 1981

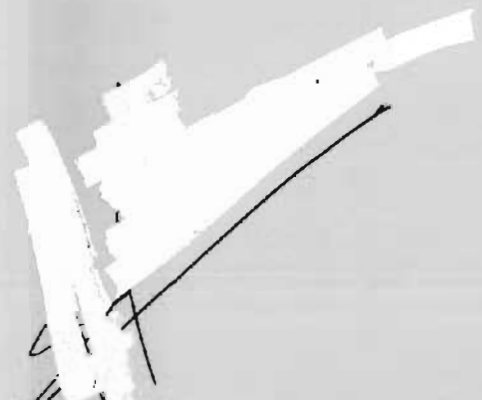
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In treating sites that were occupationally differentiated within a system, I adopted the term *grain* (L. R. Binford 1978b:482-483) to refer to properties of assemblages. *Fine-grained assemblages* are those in which all the included items, features, and land surfaces relate to a very few events; that is, all associated archaeological characteristics of the deposit are the consequences of basically the same events. *Coarse-grained assemblages* accumulate over a considerable period of time and/or during periods of rapid "turnover" of events, resulting in the association of items, debris, features, land surfaces, and the like that were differential participants in different events during the course of the occupation. Thus, the term *grain* refers to the relative contextual complexity of an assemblage from the perspective of events occurring during the course of a continuous occupation and derivative production of an archaeological assemblage. Recognizing that deposits may be variable in integrity, and in turn in resolution even given high levels of integrity, we must *minimally* have some reliable means of referring observed patterns of association to potentially different formation contexts. We must further recognize that the resolution of an assemblage must be assessed at several organizational levels before meaningful comparisons can be carried out. We may find assemblages to have low resolution because of independent occupational episodes, or because of the relative redundancy in the events occurring within a given occupational epi-

sode. These and other differences surely contribute to differences in content and hence meaning.

In later chapters of this book it will be emphasized that carnivores are apt to generate distinctive faunal assemblages in basically two contexts: at kills, and within and around lairs. These two types of assemblage, as well as contributions from natural deaths, can be considered as very likely contributors to the "background" faunal materials occurring in most any geological deposit where bones have been preserved. As suggested earlier, preservation is most likely in caves and rockshelters and in open deposits accumulated where burial was relatively quick and where moisture was either very high or very low.

I have suggested that most if not all, locations yielding evidence of our Pleistocene ancestors are most likely geological deposits, not archaeological deposits as is commonly assumed.

This assessment of the character of our Lower and Middle Paleolithic data demands that we develop means for recognizing the derivatives of different agents and different events as contributors to the geologically associated palimpsests within which may occur some traces of hominid behavior. We can no longer be content with such tautological conditions as identifying a habitation or living site by virtue of the presence of relics and other associated remains—generally bones—and then using the data from such sites to prove the nature of man's home life or other characteristic behaviors!



## Chapter 2

### Middle-range research and the role of actualistic studies

In the previous chapter I showed that the assumptions made regarding the conditions under which the archaeological record was formed directly condition the character of inferences about the contents of the archaeological record. I showed that we may be frequently incorrect or at least highly uncertain about our reconstruction of the past. In this chapter I will explore a somewhat more complicated issue—how we might proceed so as to minimize the likelihood of constructing false pictures of the past. I will be directly concerned with research tactics and how we might use secure knowledge to aid in the development of new knowledge or understanding regarding the past. *How do we carve out knowledge from ignorance?*

The challenge to archaeologists is simply this: How do we proceed? How do we unify the world of archaeological things with our ideas as to the character of the past? How may we use the empirical world of archaeological phenomena to stimulate ideas about the past and at the same time use these empirical experiences to evaluate the resulting ideas? How can we proceed so as to develop confidence that our ideas of the past are informative about the actual past? We face the challenge of science itself—how to keep our feet on the "empirical" ground and our heads in the "theoretical" sky. Basic to the development of a science is a recognition of the domain to

which scientific procedures might be profitably addressed—empirical with respect to what? Theoretical with respect to what?

Many archaeologists accept the argument that the discipline of archaeology needs to adopt a scientific approach, yet they are not necessarily in agreement as to the domain of experience to which such an approach is to be most profitably addressed:

there is in a sense an "archaeological theory" although it might be better characterized as evolutionary anthropology... human and cultural evolution is of such scientific and intrinsic interest that there is certainly an essential nomothetic role to be played by archaeologists [Watson et al. 1971:164].

In the foregoing view, archaeological theory addresses a domain of past events and conditions. It is concerned with explaining why certain events and systems came into being in the past. It addresses the domain that most traditional archaeologists considered to be their target for seeking understanding: such interesting problems as the origins of the state, the shift to agricultural production, or perhaps the origins of culture itself. Under this view of "doing" archaeology, the act of investigating the archaeological record is viewed as the experimental phase or perhaps the archival phase of investigating the past. I have referred to such interests as *general research* or *general theory building*. By these phrases I refer to the actions of investigators seeking to explain characteristics of cultural systems past and present. The domain of interest is cultural systems, how they vary, and how they may be modified from one form to another. The domain is interactive, generative, and dynamic.

Important, however, is the fact that all knowledge of the dynamics of the past must be inferred:

To say that historians construct the past so as not to falsify certain theoretical presuppositions is not to point to a defect in historians or in their method. It is to focus upon the means historians use to find out what happened. It is to say, in a somewhat different way, what has been said before: that we infer the events of the past from the events of the present by linking them in terms of some general principles [Kitts 1977:67-68].

If we recognize that science is concerned with developing means for increasing our understanding

or observations of nature, this implies that science is simultaneously attempting to generate understanding and to sharpen or increase the informational potential of our observations. The archaeologist investigates phenomena that he has reason to believe remain from the past. These investigations are conducted in the present, resulting in all the observational statements generated by archaeologists being contemporary facts. How does the archaeologist convert these contemporary observational statements or facts into meaningful statements about the past? The first thing that must be realized is that this can only be accomplished intellectually or with reason. Thus there is no way of converting observational statements about the present into meaningful statements about the past in the absence of a reasoning process.

Insofar as archaeology remains a discipline that searches for an understanding of the past through the use of objects and other organizations of matter believed to have been parts of past situations, archaeologists must operate as historians attempting to give meaning to observations on the particular archaeological record being investigated. The accuracy with which we may accomplish the conversion of contemporary observational statements into meaningful statements about the past is a direct function of the character of the reasoning processes employed and the methodology developed for evaluating the products of this process.

Our problem is then twofold: (a) We must know the past by virtue of inferences drawn from knowledge of how the contemporary world works, the principles mentioned by Kitts, and (b) we must be able to justify the assumption that these principles are relevant—that at least in terms of the properties of the principles, the past was like the present; we must make a uniformitarian assumption.

The point that we must use general principles in giving "historical" meaning to our observations no longer seems at issue:

History differs from the generalizing social sciences only in that its primary aim is to explain individual situations in all their complexity rather than to formulate general laws for indefinitely repeatable events and processes. That is what is meant by saying that history is idiographic, the social science nomothetic. [Nagel 1961:547; Elton 1969:22-24, 41]. This does not mean that historians deny the existence of general rules:

rather they seek to employ them to gain an understanding of individual (i.e., unique) and non-recurrent situations [Trigger 1978:26-27].

Where do such general principles come from, and how can we be assured of their accuracy and relevance to our activities as archaeologists seeking to explicate the past?

Those who claim that archaeologists should be historians and not scientists most commonly advise that we should "borrow" our general principles from other nomothetic sciences. The trouble with this suggestion is that I know of no nomothetic science attempting to understand the archaeological record! Many other "sciences" may be concerned with various aspects of human behavior, history, and sociocultural change in which the phenomena studied are events, behavior, or patterning in communicated thought. However, the basic phenomena with which we work are (a) static, (b) material, and (c) untranslated into symbols or clues to human "thoughts." No other "science" addresses such phenomena. It was the recognition of this fact that prompted the following statement written in 1966 and published two years later:

Accepting Spaulding's minimal definition of what archaeology is, we can go a step further and specify its aim as the explanation... of the order we observe in the archaeological record. 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 [S. R. Binford and L. R. Binford 1968:2].

Directing attention to the archaeological record rather than continuing the self-deceit that we were studying the past seemed central to progress. My view was that we could not reconstruct history until we first addressed the problem of how we give meaning to the archaeological record [see L. R. Binford 1968d]. Meanings are carried by concepts and arguments and the archaeological record contains only arrangements of matter. If archaeologists are to know anything of the past, they must develop a science. The domain of this science must be the archaeological record per se.

In seeking to develop a science of the archaeological record, are there not some fundamental characteristics of both science and the archaeological record that we must consider to guide the growth of this science? The answer must of course be yes. One characteristic particularly important to the arguments advocating a science of the archaeological record is that science attempts to evaluate the role and utility of ideas for enhancing understanding. Ideas are of course cultural forms:

if we view culture as at least referring to the particularly human ability to give meaning expediently to experience, to symbol, and in turn, view experience through this conceptual idiom, science is then concerned with evaluating the utility of the cultural tools produced [L. R. Binford 1977a:3].

The reference to the "cultural tools" produced is of course to the concepts and ideas in terms of which we conceive the world of experience. If we gain a "knowledge" of the world through the use of cognitive devices, words, concepts, and ideas, and the world is described in these terms, we must face the problem of the accuracy, utility, and "reality" of such cognitive devices themselves. This is one fundamental problem the scientist must face. The second problem relates to the degree to which we seek knowledge and understanding beyond simple description. We frequently attempt to understand why the world is the way it appears to be, given the description generated. Scientists carry out their work with essentially two sets of intellectual tools: a conceptual frame of reference or paradigm (Kuhn 1962), and various theories that seek to explain the world as "known" through the use of the paradigm.

### The Paradigm—One's Guide to Describing the World

The cognitive frame of reference or paradigm consists of the ideas and concepts with which we approach experience. These condition what one considers relevant to describe or chooses to discuss as of interest. One's cognitive frame of reference may be thought of as the culture of a science. It consists of

the concepts in terms of which experience is intellectually assimilated. Despite all the definitional controversy (see Masterman 1970), I follow Kuhn (1977) in viewing paradigm as the intellectual terms upon which one meets experience. The character of one's frame of reference conditions what is considered relevant to describe, what is interesting to discuss, and even how we view the world in terms of problems to be solved. In short, it is what we expect the world to be like. Things become complicated when we recognize that we cannot gain a direct knowledge of the essential properties of the world. Our cognition is neither direct nor objective, but may be indirect and subjective relative to our beliefs about the world (i.e., our paradigm).

We generally defend our claims about what the world is like with inferential arguments. I prefer to call these *warranting arguments*; they are arguments advanced that tend to warrant to others the beliefs one has about the world. If done in a robust manner, they make one's claims appear plausible, and acceptable to others. Rarely are such arguments formalized in that the premises are rarely explicitly stated, so conclusions are warranted by appeal to a "common body of knowledge or belief." The more comprehensive the alleged knowledge, or widespread the belief serving as the intellectual context for a warranting argument, the more plausible it appears and therefore the greater likelihood it has of being accepted.

Working within a frame of reference is similar to participation in any other culture; we accommodate experience through our shared cognitive devices. The fact that they facilitate this accommodation appears to us as proof that the world is in fact the way we expect it to be. We may be astonished that others do not see the world the way we do. Anthropologists should be familiar with cultural differences and should be fairly comfortable with the idea that the nature of experience does not necessarily determine the nature of culture. Many persons share identical experiences yet ascribe to them very different meanings; this is essentially the message of anthropology. Cultural man has for all time believed that his beliefs were given by "reality" and were therefore "right," whereas those of other cultures were clearly misguided or "stupid" for not having seen the "truth" inherent in given experience.

Archaeology is perhaps in a fortunate position. Although there is much contemporary "culture" or paradigmatic bias regarding the nature of man and the causes of history, there is very little folk knowledge regarding the formation of the archaeological record. This means that there is little explicit prior development of cognitive devices and frames of reference for accommodating archaeological phenomena in the literal, static sense of the word. For the further development of archaeology, the growth of a paradigm, developing cognitive means for identifying properties of the past or diagnosing the archaeological record and thereby giving meaning to the archaeological record, is crucial.

Much of the time use of a paradigm is viewed as an act of identification. Can we identify a habitation, a hide scraper, a matrilineage, a base camp, agriculture? Or can we diagnose the functions of a site, tool, or element of debris? In most cases we are seeking an unambiguous definition, and realistic concepts with which to partition or diagnose the archaeological record and thereby generate meaningful statements about the past. All such interpretations are dependent on a general, accurate, and unambiguous knowledge of the relationship between statics and dynamics, the formal consequences for organized matter that derive from the operation of a dynamic system. In developed sciences, what is being sought here at the conscious level through "middle-range" research may be taken for granted as paradigmatic:

The distinction between "empirical" and "theoretical" . . . may be only a relative one. It is relative historically. . . . A scientist who undertakes the study of a particular problem, for example of a biological one, and who uses various scientific instruments constructed on the grounds of different physical theories, is quite aware of the fact that together with the equipment he uses he accepts also these theories. In spite of this fact, however, he will treat the statements he will formulate by means of these instruments as observational. The observational language is, for him, something already present and historically given by the development of science and common knowledge [Amsterdamski 1975:86].

An *observational language* is essentially nonexistent in archaeology. The concepts and hence paradigmatic characteristics of traditional archaeology are believed to be essentially useless for

modern archaeology. Today the archaeological record is not being viewed (by most) as a material manifestation of mental phenomena; it is not being viewed as a preserved past; it is not being viewed as uniquely determined by history; its variability is not being viewed exclusively as a manifestation of past ethnic variability, and so on. As is suggested by Amsterdamski, the instruments that permit and facilitate unambiguous meaningful observations must be developed, demonstrated, and tested, using scientific means. Later, as the science of archaeology becomes more mature, these "instruments for measurement" may be taken for granted and results of their use treated as direct observations on the past.

We are a long way from this level of maturity today. We need to recognize very explicitly the current state of the art and address the growth of a new paradigm as basic and fundamental. Recognizing that this is a *historical phase in the growth of the "new archaeology,"* I began using a special term for this endeavor: *middle-range research* or *middle-range theory building*.<sup>1</sup>

What we are seeking through middle-range research are 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 statement 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.

### Theory—One's Guide to Explaining the World

Theories are the key to the scientific understanding of empirical phenomena, and they are normally developed only when previous research has yielded a

<sup>1</sup>This is essentially identical to what David Clarke called *interpretive theory* (Clarke 1973:8) and appears to be what Schiffer (1976) means by *behavioral archaeology*. (See also Sullivan 1978.)

body of information, including empirical generalizations about the phenomena in question. A theory is then intended to provide deeper understanding by presenting those phenomena as manifestations of certain underlying processes (Hempel 1977:244; emphasis mine).

Given that we have made observations on the archaeological record, offered some generalizations about its properties, and gained considerable experience with the record, I must now ask the crucial question: Why is the archaeological record the way it appears to be? When we seek to reason about the "causes" of the world as known, we are attempting to build theories about the world. "Where it is some event or system of events that is to be explained, explanation has to do with cause [Quine and Ullian 1978:111]."

We are concerned with organizational properties of the world. We seek to understand how the properties of entities and/or events were produced in characteristic ways:

One very central use of "theory" involves an epistemic device which is used to characterize the state-change behavior of isolated systems within a general class of phenomena . . . one can discover that they [theories] invariably postulate a class of states of systems' change over time. . . and are used to characterize how natural classes of phenomena would behave if isolated [Suppe 1977:658].

Quite literally, theories are the answers to the "why" questions of dynamics. They are concerned with understanding variability and how systems proceed from one state to another.

If we are going to build a theoretically informed paradigm for referring observations on the archaeological record to dynamic conditions in the past, where do we begin? It seems to me we must begin with certain fundamental statements of "being as such." The archaeological record is a static contemporary phenomenon. It is structured matter motionless and noninteractive in terms of the properties of historical interest to the archaeologist.

Only a universe of energy could have no past. If there is matter, structures grow and differentiate and a past can be recognized and partially reconstructed. It is the problem of durationless non-matter versus enduring mat-



ter. . . . At one end of the spectrum is biblical chaos, a past without a past, because no matter exists to convey information. At the other end there is only information and no decisions—static information forever (Margalef 1968:97).

The archaeologist is of course working with static information preserved in structured arrangements of matter. Since there is no energy remaining, there are no culturally relevant interactive relationships to be observed in the archaeological record. Such relationships existed in the past but ceased when system-serving energy was no longer powering the rearrangement and modification of matter—in short, once a static condition was achieved. In a very essential way the contents of the archaeological record must be viewed as products of a complex mechanical system of causation. It was mechanical in that the fundamental genesis of the archaeological structure is a situation of forces acting to modify matter in both its organizational and distributional properties. The archaeological record is a structure of relationships between the distribution and form of matter as caused by energy sources acting on matter in the past. In one very important sense, all properties of matter, whether they be chips removed from a flake of flint, mixing of soil betraying the former location of a pit, piles of debris from meals, or the remnants of a construction such as a mud brick wall, are the mechanical consequences of the actions of forces on matter.

I used the term causal in the literal sense, that is, to express the idea of a category of generic connections; it refers to the way of producing things. Or, "something, E, is brought forth by something else, C, in a necessary (constant and unique) manner (Bunge 1979:49)."

Clearly if we can isolate causal relationships between things, and if we can understand such relationships in terms of more general principles of necessity, such as the theories of mechanics or some other basic science, then we have a strong warrant for the inference of the cause from the observed effects. We would be building a strong theoretically informed bridge between properties of the contemporary archaeological record and characteristics of the dynamic past.

Insofar as our inferences regarding the past refer to the causal relationships that obtained between

dynamics and its static derivatives, then any attempts to discover the character of such causal relationships must reasonably be conducted through the study of living systems where both dynamics and static derivatives may be potentially observed. Taking as an example the problem outlined in Chapter 1, the identification of the agency (energy source) responsible for generating certain patterns remaining in the archaeological record, we might reason as follows:

First, we must attempt to isolate the different agents or forces that might be expected to contribute to or "cause" a given pattern. Second, we would have to conduct studies of these agents or processes in the contemporary world so as to develop criteria of recognition. In short, we need to specify criteria for recognizing traces, "signature patterns" apt to be preserved in the archaeological record, of the agents likely to have contributed to deposits in which hominid remains might also occur. The procedure is similar to that painstakingly worked out over the years for recognizing lithic materials modified by man as opposed to stones modified through other natural processes. The problem is one of pattern recognition linked with the demonstration that the pattern is redundant and unambiguous, a diagnostic signature that discriminates one agent or set of agents from another.

Such a demonstration must be developed by studying phenomena actively generated in a contemporary setting, since there must be little problem of inference regarding the identify of the agent producing the patterning or traces that one is demonstrating as a signature pattern sufficient for the unambiguous identification of the agent. The problem is one similar to the development of a key identification of animals through the study of their footprints. The persons who develop the knowledge that permits the recognition of the track, and hence the identification of the animal responsible, must study the footprints of identified animals so that the relationship between animal and track is a controlled or known relationship. Given such a control in the contemporary world, and given that one is successful in recognizing and describing diagnostic criteria (constant and unique) between cause and effect, animal and footprint, then when one encounters the diagnostic footprint in the future the inference of the

prior presence of the indicated animal may be considered an inference of high probability.

For an inference about the past to be of high probability, an additional proposition must be met—that the same relationships obtained in the past as obtained in the present between bears and their footprints! Here we introduce the interesting and important, perhaps crucial, problem archaeologists must solve—how do we justify a uniformitarian assumption? This issue is perhaps well illustrated through a discussion of the treatment given the problem by the pioneers of historical geology:

(a)

Lyell's concept of uniformity has four major, and very different, components:

- (1) Natural laws are constant (uniform) in space and time. As John Stuart Mill showed, this is not a statement about the world; it is an a priori claim of method that scientists must make in order to proceed with any analysis of the past. If the past is capricious, if God violates natural law at will, then science cannot unravel history.
- (2) Processes now operating to mould the earth's surface should be invoked to explain the events of the past (uniformity of process through time). Only present processes can be directly observed. Therefore, we are better off if we can explain past events as a result of processes still acting. This again is not an argument about the world, it is a statement about scientific procedure (S. J. Gould 1977:150; emphasis mine).

As was pointed out by Gould, the remaining two senses in which Lyell used the concept of uniformity were in fact assumptions about the world, existential in character. One has been largely sustained by research (i.e., geologic change was largely uniform in rate, slow, gradual and steady, not cataclysmic). The other claim was also existential, namely that the earth has a uniform configuration, or it has been fundamentally the same since its formation. Most would agree that this has been demonstrated to be quite false as a general descriptive statement.

What is indicated here is that we must make uniformitarian assumptions if we are to gain any understanding of the past. On the other hand, when we do so we are making empirical claims about the past and these must be warranted; they must be subjected to evaluation. The degree to which such uniformitarian assumptions are warranted is a measure

of the degree to which our inferences drawn from knowledge of the contemporary world and/or our understanding of its processes in the form of theories and laws are relevant to the past.

Insofar as our inferences regarding the past refer to the dynamics of the past, these inferences must be accomplished by appeals to principles or knowledge about dynamics and how static properties preserved in the archaeological record may be derived from dynamics. Since the only access a researcher has to dynamics is through contemporary experience, all research directed toward the development of principles that serve to make possible inferences about the past must be conducted with documented dynamic situations generally in the present. Such knowledge of "connections" between statics and dynamics must derive from experimental research conducted with documented living systems.

Since knowledge of dynamics derives from experience with living systems, observations of linkage between statics and dynamics must be made on living systems. In order to use these principles of linkage for making statements about the past, we must make a uniformitarian assumption with respect to the properties used in inference. In short, we must assume that knowledge gained from actualistic studies is relevant and applicable to the living systems of the past. This basic proposition must be true if inferences employing principles gained through the study of contemporary dynamics are to be used in inferring the past from patterned statics. This means that the assumption is always conditional and may be false; that is, we could be wrong in our judgments regarding the condition shared by systems or entities of the past and the present.

For instance, any number of "correlates" between statics and dynamics might be observed in the modern world. However, the first question we must ask is whether we are observing an incidence of cause and effect, or whether there is simply correlation or coincidence. The second, and equally important, question to be considered is whether the proposed causation was also characteristic of the past. Both questions must be answered affirmatively before an actualistic observation may realistically serve as a premise for inferences regarding the past.

Although I basically agree with much of Schiffer's (1972, 1976, 1978) general discussion of ar-

chaeology and the need for understanding of formation processes. I generally disagree with almost all of his suggestions as to how to solve archaeological problems. He fails to make the critical distinction between description and explanation. This is clear as he cites Nagel for "experimental laws" (i.e., empirical generalizations) and Hempel for "covering laws" (i.e., theoretical laws), as if these were the same thing (see Schiffer 1976:4). Schiffer also argues that "the subject matter of archaeology is the relationship between human behavior and material culture in all times and places [p. 4]." I might agree that this is one way of viewing the concerns of middle-range research, but find it hard to accept as the central focus for archaeology since the archaeological record contains no direct information on this subject whatsoever!

How do we know what experiences with living systems are relevant to the past? This question is particularly germane with regard to central issues such as identification. Identification, as mentioned earlier, is a key issue in archaeology, since it is this "act" that establishes the language for discussing the past, and in turn the language carries meanings and provides the units for logical analysis. Identifying things (see Whitehead 1967:144) becomes the act of translating from the domain of matter into the domain of ideas. It is the identities that bridge the gap between the past and the present, that provide, as Whitehead (1967:159) would say, the "eternal objects," the "durables," which serve as the basis for recognizing events, the basis for analyzing events and recognizing transitions from one event to another:

Whatever passes is an event. But we find entities in nature which do not pass. . . . Factors in nature which are without passage will be called objects. . . . recognition is reflected in the intellect as comparison. . . . but it is not the events which are compared. For each event is essentially unique and incomparable. What are compared are the objects and relations of objects situated in events [Whitehead 1957:124-125].

It seems to me that uniformitarian assumptions function much like intellectual anchors, for they provide the "points of knowledge" from which we

may judge the extent of our ignorance regarding properties of the archaeological record.

What are the durable unchanging characteristics that the events of the present share with the past? As I indicated elsewhere [L. R. Binford 1977a:8].

We may reasonably ask . . . whether or not there are classes of data remaining from the past which might better support uniformitarian assumptions. In short, are there not classes of phenomena available to us for which a more reliable set of conditions might be projected into the past than for human behavior per se?<sup>2</sup>

I answered the rhetorical question by suggesting that the study of the spatial structure or the arrangement of "objects," in the Whitehead (1957:124) sense of the world, would be a useful area for development. I continue to be of this opinion. On the other hand, I had suggested that ecological and anatomical characteristics of the species still extant with which ancient man interacted were enduring objects for which uniformitarian assumptions might be securely warranted. It is hoped that others will elaborate this list of domains and pursue middle-range research along as many diverse lines as we may be able to justify uniformitarian assumptions.

I began the discussion in Chapter 1 with a demonstration that the "interpretation" of certain archaeological observations was dependent on a basic premise, an assumption about the conditions in the past surrounding the formation of the deposit within which archaeological remains were recovered. I showed that the assumption was generally made that man was the agent responsible for the disposition of all materials found in association with demonstrable artifacts. All the "interpretations"—the postulation of bear cults, cannibalism among early hominid populations, mass killing of elephants at Torralba, systematic hunting of hyena by Neanderthals at Pin Hole shelter—were inferential arguments consist-

<sup>2</sup>Richard Gould has argued that, since some characteristics appear unlikely to bridge the present and the past, we should avoid uniformitarian assumptions. "The less the archaeologist must depend upon uniformitarian assumptions to infer past human behavior, the more valid his explanations will be [R. A. Gould 1978:255]." This is nonsense, in my view, since any inference, even a simple identification, to the past must make a uniformitarian assumption.

ent with the initial assumptions, the premises upon which the inferences rested. There is an important characteristic of all inferential arguments, simply that we can never reason in a valid manner from premises to a conclusion that contradicts the premises with which we start. This fact has important implications for archaeologists:

1. All our statements about the past are inferences relative to observations made on the contemporary archaeological record.
2. The accuracy of our inferential constructions of the past is directly dependent on the accuracy of the assumptions or premises serving as the basis of our inferential arguments.

The conclusion we must draw is that we cannot use either the archaeological record or the inferred past to test our premises or assumptions. Quite literally, all our reasoning is "locked in" by our original premises and observational language. (Unless we can take our premises to experience and permit experience to pass judgment on their accuracy, we can never gain a critical perspective with regard to our beliefs about the past. "Can we present historical events as instances or confirmation for a law? We cannot if the very law we wish to test has been presupposed in inferring the event [Kitts 1977:79].")

Put another way, since we construct the past inferentially we cannot use our constructions to test the accuracy of the premises that provided the basis for the characteristics constructed.

Since we cannot use the inferred characteristics of the past to test the basis for our inferential procedures, how do we develop reliable means for knowing the past? The answer, as I have intimated, is that we must engage in middle-range research, which consists of actualistic studies designed to control for the relationship between dynamic properties of the past about which one seeks knowledge and the static material properties common to the past and the present, Whitehead's "eternal objects"—in short, the characteristics about which uniformitarian assumptions may be made, those things which the present shares with the past. These common things provide the basis for a comparison of the events of the present with the events of the past or events from different times in the past.

The reason that middle-range research must be basically actualistic is that only in the present can we observe the bear and the footprint together, the coincidence of the dynamic and the static derivatives. In more mature disciplines, where a relatively sound methodology and a sophisticated observational language exist, it may be possible to use inferred conditions about the past as premises for further inferences if the initial premises serving as the basis of the original inference are securely documented and "verified" at the middle-range level of research. As illustrated in Chapter 1, this is probably a very risky strategy, given the lack of sophistication in contemporary archaeology.

The dependence of our knowledge of the past on inference rather than direct observation renders the relationship between paradigm (the conceptual tool of description) and theory (the conceptual tool of explanation) vague, it also renders the "independence" of observations from explanations frequently suspect and commonly standing in a built in relationship, thereby committing the fallacy of "confirming the consequent."

It is this condition that renders it imperative that our methods for constructing the past be intellectually independent of our theories for explaining the past. That is, the theories explaining the archaeological record, the work that provides our observational language and conveys meaning to archaeological phenomena, must be intellectually independent of our a priori ideas of the past, or our theories regarding the processes responsible for past events, patterns of change, or stability. ~~Our middle-range theory must be intellectually independent of our general theory.~~ Middle-range theory must be tested primarily with documented living systems. Middle-range theory treats the relationship between statics and dynamics, between behavior and material derivatives. General theory may be tested using archaeological phenomena meaningfully operationalized through middle-range research. Stated another way, general theory must be evaluated using instruments for measuring the variables specified in the theory. These instruments must have been developed independently through middle-range research. In the absence of methods for reliably monitoring the variables said to be determinantly