Archaeology as Behavioral Science[1]

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Archaeology is argued here to have a significant behavioral science component. Various kinds of laws used in the study of the past—correlates, c-transforms, n-transforms, and the laws of socio-cultural variability and change—are not readily borrowed from other sciences. It is shown that in order to fill these substantial gaps in scientific knowledge, archaeologists have for some time been carrying out nomothetic studies.

FOR A NUMBER OF YEARS debates have raged about whether archaeology is more properly considered as a historical (idiographic) or a scientific (nomothetic) discipline (e.g., Trigger 1970, 1973 vs. Watson, LeBlanc, and Redman 1971; Watson 1973). On the one hand, many (but by no means all) processualists claim that archaeology must recognize and assume its rightful place within anthropology specifically and social science generally; this is to be accomplished by exploiting the unique time-depth property of the archaeological record for testing principles of long-term culture change (Binford 1962; Leone 1968; F. Plog 1973, 1974; Martin and Plog 1973; Watson, LeBlanc, and Redman 1971; Woodall 1972; Zubrow 1971, 1975). Despite the concurrence of a number of cultural anthropologists (Harris 1968a, 1968b; Scott Cook 1973; Titiev 1961; Kottak 1974), this view of archaeology's scientific role has not been universally acclaimed.

On the other side of the debate are prehistorians like Trigger (1970) who readily admit to using laws when interpreting and explaining past events, but also claim that the generation and testing of these very same laws falls beyond the legitimate purview of archaeology. Trigger (1970:36) states: "Archaeology best fulfills its potential not by trying to duplicate work being done in the social sciences but by providing detailed information about the actual course of sociocultural development." Thus, in the intellectual food chain, archaeology is a law-consumer, while other disciplines like sociology and cultural anthropology are law-producers. This position has superficial appeal; after all, a division of labor would seem to be an efficient way to encourage specialization and rapid advances of knowledge in tightly circumscribed domains.

Attractive though this proposed division of labor appears on the surface, it rests on two untenable assumptions. The first assumption is that the social sciences have already produced the laws of culture change, and that archaeologists need only assemble and transfer them to archaeology where they may be put in the service of idiographic goals. However, a prospective borrower who cares to glance at Berelson and Steiner's massive inventory of social science findings (Berelson and Steiner 1964) will surely be disappointed if his interest is in culture change. In this volume of 712 pages, only seven are devoted to the topic of "social change," and many of the listed principles evince a detectable ethnocentric bias. The section on culture and culture change is allotted a stingy fourteen pages, in which one can find many of the worn-out but continually recycled truisms of American Idealist

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anthropology. It would seem that archaeology can hardly rely on sociology for the laws it needs to explain variability and change in past cultural systems.

In the decade since the publication of Berelson and Steiner's compendium, cultural anthropology has progressed to the point where a small handful of investigators are asking the kinds of general questions that promise to lead to the discovery of some laws of culture change. Various studies performed under the explicit or implicit umbrella of the cultural materialist strategy (Harris 1968b) are beginning to reveal regularities at various scales (e.g., Carneiro 1967, 1974; Rappaport 1968). While archaeologists can look forward to applying the principles generated by these studies, the fact remains that most cultural and social anthropologists are concerned with culture-specific phenomena having no nomothetic import. A glance through any recent journal should suffice to document this claim.

Another approach to nomothetic research is through cross-cultural comparison. Unfortunately, the many regularities uncovered in cross-cultural studies using the Human Relations Area Files (Naroll 1970) seldom deal with culture change, and more seldom still are they successful in explaining more than fifty percent of the variance in any dependent variable. Few of these statements of correlation could be used as general principles with any confidence by archaeologists. It would seem that whether one looks with a covetous eye to sociology or to cultural anthropology, few principles of culture change worthy of borrowing are to be found, though some cultural anthropologists are beginning to ask the right kinds of questions.

The second erroneous assumption supporting the archaeology-as-law-consumer view is that archaeologists employ laws only when they offer *explanations* for past cultural events. It is the detailed refutation of this assumption and the nomothetic implications of that refutation which occupy the remainder of this paper. I attempt to demonstrate that archaeologists use a surprising variety of laws—often tacitly, to be sure. Many of these laws are used to explain past events and to explain variability and change in sociocultural systems. However, countless others are required merely to *describe* past events and the behavioral properties of past systems (cf. Schiffer 1972a)—to solve problems posed by the nature of archaeological data. Because questions appropriate for developing these laws are rarely raised in other sciences, archaeologists have always invented and, in many cases, tested laws to fill the gaps in scientific knowledge. They are doing so now at an ever-increasing rate as a broader range of questions is being asked about what went on in the past—and why.

LAWS IN ARCHAEOLOGY

The following discussion is focused by several questions:

(1) What kinds of laws do archaeologists use; that is, can one discern recurrent types that describe relationships between similar classes of substantive variables?

(2) How do laws of each type function to facilitate descriptions and explanations of past cultural behavior?

(3) Where do these laws come from?

Ultimately, the issues of history versus science, and of laws in archaeology, boil down to nothing more than these simple questions. If the answer to Question (3) discloses that archaeologists have produced non-redundant contributions to science, then Trigger and others must concede by acknowledging the important nomothetic aspects of archaeology.[2]

In all sciences, explanation and prediction of empirical phenomena are made possible by laws, sometimes called "experimental" laws (Nagel 1961:79-90). Laws of this sort state relationships between two or more operationally defined variables. Such statements contain no spatial or temporal parameters, though the explanations in which these laws are used do. Statistical laws are one variety of experimental law and carry out the same functions.

Experimental laws are differentiated from "theoretical" laws or "theories" by several criteria. Theories are more complex, more abstract, and more general than experimental laws, and are not subject to inductive derivation (Nagel 1961:83-90). Theories explain experimental laws, while experimental laws explain and predict empirical phenomena. Though Nagel's distinction between laws and theories does not neatly fit all scientific principles, I emphasize that the concern in this paper is with the lower-level, more empirical laws—regardless of what they are called.

For a number of years the conceptual basis of archaeological inference has been recognized.[3] That is, it is by the application of nomothetically integrated concepts and principles that investigators are able to recognize aspects of the archaeological record as informative of certain events and behaviors of the past (Fritz 1968, 1972). Only recently, however, has this rudimentary insight been amplified to any extent. We are now in a position to ask and perhaps answer meaningful questions about how laws function in the derivation and justification of archaeological inferences. By *inference*, I mean any descriptive statement of high probability about past cultural behavior or organization. A synthetic model of archaeological inference, detailing the roles played by three kinds of archaeological laws, has been presented elsewhere (Schiffer 1973a). I now briefly describe these laws and their functions.

The archaeological record at a site is a static, three-dimensional structure of materials existing in the present. The remains in this site have undergone successive transformations from the time they once participated in a behavioral system to the time they are observed by the archaeologist. These transformations are effected by the cultural and noncultural formation processes of the archaeological record. Cultural formation processes are activities, such as discarding wornout tools and waste products, disposing of the dead, and abandoning usable items when leaving a site, which transform materials from systemic context to archaeological context (Schiffer 1972b, 1973a).[4] Noncultural formation processes, such as aeolian deposition, erosion, and animal burrowing, act on culturally deposited materials and transform them further. It is by modeling the successive transformations to which archaeological materials have been subjected that relevant units of analysis are isolated to which other laws may be applied for the derivation of knowledge of the past (Reid 1973; Reid, Schiffer, and Neff 1975; Schiffer 1973a).

Transformations are modeled through the use of two sets of archaeological laws. The first set, "c-transforms" (Schiffer and Rathje 1973), describes the cultural formation processes of the archaeological record. These laws relate variables pertaining to the behavioral and organizational properties of a sociocultural system to variables describing aspects of the archaeological outputs of that system. The laws of noncultural formation processes are termed "n-transforms" (Schiffer and Rathje 1973). N-transforms specify the interaction between culturally-deposited materials and variables of the environment in which those materials were deposited. Taken together, c-transforms and n-transforms provide means for modeling the processes by which an archaeological site acquired specific formal, quantitative, relational, and spatial attributes.

Although c-transforms and n-transforms serve the necessary functions of isolating relevant analytic units and of accounting for the formation of the archaeological record under study, they do not in themselves provide a basis for inferring behavior from material culture (other than formation processes themselves). This latter function is carried out by another set of laws known as "correlates."[5] Correlates embody relationships between behavioral and organizational variables of a sociocultural system and variables relating to the material culture and environment of that system. Correlates are powerful conceptual tools for the archaeologist; without them, there could be no knowledge of the past. Through the use of correlates, on materials determined by c-transforms and n-transforms to be within appropriate units of analysis, the mute evidence of the past is brought to life.

Taken together, correlates, c-transforms, and n-transforms compose the covering laws that archaeologists use to explain aspects of the archaeological record. This process of explanation involves assertions as to the existence of various events or behaviors in the past. By establishing relationships (with correlates) between these hypothesized behaviors and material culture and subjecting the latter to various transformations (with c-transforms, n-transforms, or justifiable assumptions), aspects of the archaeological record are explained. If these explanations are successful, one can place some degree of confidence in the reconstructions. At its core, the acquisition of sound archaeological inferences seems to involve processes no more complex than the ones described. In short, archaeologists use the same logical framework, based on the use of laws, to explain their data as do other scientists.[6]

My students and I have tested this model of inference against the archaeological literature (Schiffer 1973a:44-52). Examination of fifty-six reports and regional syntheses has yielded a corpus of eighty-six correlates, twenty-nine c-transforms, and fifteen n-transforms, and hundreds of imperfectly expressed or incomplete statements that resemble these laws. This sample of the archaeological literature is not, of course, statistically adequate nor totally representative. Yet the fact that it included early man, petroglyph, and cave sites, Neolithic remains of the Old and New World, and sites of complex cultural systems of both hemispheres, approached from various theoretical viewpoints, leads me to suspect that no other major patterns of inference will be found. The results of the test showed conclusively that most archaeological explanations are elliptical (i.e., the laws are implicit). Nevertheless, the discovery of numerous explicit laws, functioning in the manner specified by the model of inference, supports the view that several major types of laws are in common—if usually implicit—archaeological use.

Another major type of law in archaeology performs the function of explaining socio-cultural variability and change. Once behavioral events are documented by means of correlates, c-transforms, and n-transforms, the laws of socio-cultural change come into play. It is these laws which carry the major explanatory load in comparative studies. Processualists have made the formulation and testing of these laws their paramount aim (e.g., F. Plog 1974).

To this point the discussion has been very general. To buttress my major arguments, and answer more fully the three questions posed at the beginning of this paper, I now discuss and present examples for each of the four major types of law. Particular attention is paid to the sources of these laws. No claim is made that the examples are fully representative of all laws of a type, though I have attempted to include as much variety as possible. In the selection of examples, I have followed a pragmatic directive, using only explicit laws which have come to my attention. Nevertheless, I believe this presentation fully supports my claim that archaeologists have asked questions about the past which have required them to invent, test, and use nomothetic statements that have not been produced by the other sciences.

C-TRANSFORMS

The cultural processes responsible for forming the archaeological record are poorly understood at present, and the known laws describing these processes have not been made explicit and formalized to any great extent. Nevertheless, the literature does contain some examples that serve in this discussion to illustrate the contribution made by archaeologists to the investigation of this domain.

In a study of recently abandoned sites of the Seri Indians of northwest Mexico, Ascher has generated a useful c-transform. When rephrased in its most general form, it states that if sites are differentially abandoned, usable materials discarded in early abandoned areas will be scavenged and used in areas that continue to be occupied (adapted from Ascher

1968:50-51). Ascher's important study is one of the first attempts to observe ongoing cultural formation processes in a systematic fashion.

Worsaae's Law states that items associated in burials were in use at the same time. As amended by Rowe (1962), the law proposes that items associated in burials were manufactured and used contemporaneously. When applied to materials with a relatively short use-life, or on an appropriate scale of precision, this c-transform has been a very useful principle. It is hardly necessary to point out that Ascher, Worsaae, and Rowe are all archaeologists, and that these c-transforms are not likely to have arisen in contexts other than archaeological research.

Other c-transforms account for spatial and quantitative aspects of the archaeological record. A c-transform that I have proposed is relevant here: With increasing population and intensity of occupation in an activity area, fewer items are discarded at their locations of use (adapted from Schiffer 1972b:162). A more complex c-transform accounts for the quantity of an artifact type discarded in a settlement:

$$T_D = \frac{St}{L}$$

where,

T_D = total number of artifacts discarded

S = number of artifacts normally in use

t = total period of use of the artifact type (expressed in units of time, such as months or years)

L = uselife of the artifact (expressed in the same units of time as t).[7]

Although this c-transform appears first in my work as a completely general law in equation form (Schiffer 1973a:101-102), variants of it have been repeatedly invented by archaeologists (and other anthropologists) for at least two decades (e.g., Howells 1960; Willey and McGimsey 1954; Foster 1960; David 1971; Sherburne Cook 1972). Of course, an equation such as this is useful only to the extent that sound estimates for the independent variables can be obtained. At this point it is safe to say that within any class of materials (e.g., pottery, chipped stone), there are systematic variations in uselife according to conditions of use, shape, and replacement cost, among other variables (David 1972; David and Hennig 1972; Foster 1960; Brose 1970; Gould 1970). Further studies—experimental and ethnoarchaeological—are needed to detail these relationships.

In the past few years a number of archaeologists have begun to observe cultural formation processes in ongoing systems. These investigations focus on a variety of phenomena including recycling (Stanislawski 1969), curate behavior (Binford 1973), locations of tool use and discard (Yellen 1974; Gould n.d.), and devolutionary cycles of structures (David 1971). All archaeologists stand to profit by the advances in behavioral science achieved by these innovative studies.

N-TRANSFORMS

While c-transforms are an exclusive domain of archaeology, and are poorly developed at present, the other set of laws dealing with formation processes—n-tranforms—is fairly well known, and contributions have come from many sciences. This domain of laws pertains usually to post-depositional phenomena, especially the modification and destruction of artifacts and ecofacts by chemical and physical agents. Also included in this domain are geological processes of erosion and deposition that alter site morphology, and in some cases

result in secondary deposition and dispersal of remains. Specific n-transforms describe the interaction between culturally deposited materials and environmental variables.

N-transforms derive principally from the physical sciences. For example, it is widely known that organic materials decay in the presence of the specifiable conditions favorable for the growth of soil bacteria. When this growth is inhibited by constant freezing, submersion in water, or dryness, organic materials will be preserved. Obsidian is chemically altered by the absorption of water at a constant rate, a rate that can be experimentally determined for different conditions of deposition and used for dating purposes. Acidic conditions destroy bone, but can sometimes preserve other organic materials. In deserts, sites will be sealed over by a deposit of wind-borne sand.

From these examples of n-transforms, one might be tempted to conclude that little remains to be learned from continued study of noncultural formation processes. Nothing could be farther from the truth. While many n-transforms can be found in textbooks (Hole and Heizer 1973; Clark 1957; Pyddoke 1961; Butzer 1971), much work is yet to be done—and simple borrowing from the physical sciences is not likely to accomplish it. Physical scientists, whether chemists or geologists, ask questions of natural processes far different from those asked by archaeologists (Isaac 1967). That is why, even though most n-transforms are reducible to the laws of other sciences, they cannot be derived or formulated without the use of archaeological expertise. It is the archaeological frame of question-asking that leads to the remodeling of physical science laws in terms useful for archaeological research. In addition, there exist many natural processes, such as the weathering of siliceous materials, which have simply not been studied systematically by any other science. As archaeologists discover a need to use laws of these processes, and find none available, they must investigate these processes themselves. Further, for many known processes, the "specifiable conditions" have not been precisely determined, and again it is archaeologists who are doing this work (Coles 1973). Thus, if archaeologists ask questions about noncultural formation processes, they may often have to seek the answers themselves in experimental studies of one sort or another. It is in this context that construction of experimental earthworks (Jewell and Dimbleby 1966) and other such projects becomes understandable and necessary.

CORRELATES

Correlates have just recently become a topic of discussion in the archaeological literature. These laws relate variables that can be subsumed by the broad categories of behavior, organization, material, and space.

Behavioral-material correlates are used to infer the manufacturing operations that produced an element, or the use(s) to which it was put. Statements that relate the fracturing properties of a lithic material to the particular applied forces and resultant products and by-products are examples (Schiffer 1974). Crabtree's experiments, especially on the removal of prismatic blades from polyhedral cores, provide numerous examples of correlates. The following are illustrative:

> Assuming that obsidian has been properly preformed into a core with ridges, the platform is ground until it has the appearance of frosted glass . . . The pressure crutch has been made, and the specimen is now ready for removal of the first blade . . . [Crabtree 1968:463].

> Blade types are governed by the manner in which the pressure tool is placed on the edge of the core. The triangular blade is made by directly following one ridge, and the trapezoidal type is made by positioning the tip of the pressure tool in line with but between two ridges [Crabtree 1968:465].

The establishment of many behavioral-material correlates by experiment is a noteworthy accomplishment of scientific archaeology. Studies of this sort, of which Crabtree's are

unusually well-controlled and recent examples, have been pursued by archaeologists since the last quarter of the 19th century, when questions about manufacturing techniques first came to be seriously asked. Although Speth (1972) has recently tried to borrow important laws of chipped-stone flaking from the general principles of mechanics and the properties of glassy materials discovered in other disciplines, his incomplete findings leave ample room, as he has demonstrated (Speth 1974), to approach the establishment of these correlates by experimentation (for bibliographies of experimental studies one may consult Ascher 1961; Coles 1973; Hole and Heizer 1973; Heizer and Graham 1967; Hester and Heizer 1973).

For a long time, archaeologists have implicitly used correlates treating variables of behavior and space. Whenever an interaction barrier or migration corridor is posited for the past, behavioral-spatial correlates have been employed. Because these correlates are imperfectly formed and implicitly used, there is often substantial disagreement on their application to specific cases. For several reasons, including interest in a variety of new questions, behavioral-spatial correlates are now coming into wider explicit use, especially in studies of site location and social interaction (Ucko, Tringham, and Dimbleby 1972; Clarke 1968, 1972; F. Plog 1974; S. Plog 1973; Gumerman 1971). Many of the principles of locational analysis, such as Central Place Theory and its subsidiary laws, now being borrowed from geography with increasing frequency, involve spatial and behavioral variables. The most general principle is that behavioral interaction falls off with increasing distance between reference points (Zipf 1949; Haggett 1965). Not widely known is the independent discovery of this principle by the archaeologist Flinders Petrie in 1923 (cited in Ullman 1941), a full ten years before its formal appearance in the now classic work of Christaller (1933). This underscores the argument that archaeologists have been quite resourceful in generating the laws required to conduct studies of the past. Clarke (1972) even suggests that archaeology, because of its diverse data base, may eventually be able to construct a more general locational theory than that now current in geography.

Complex correlates containing behavioral, material, and spatial variables are also in use; for example, when the frequency of access to the contents of a facility is either moderate or high, the amount of access volume varies directly with diversity of contents (adapted from Schiffer 1973b:114). This law was devised and tested in order to facilitate estimates of resources within archaeologically discovered storage facilities (Schiffer 1972a). The useful relationships discussed by Naroll (1962), Cook and Heizer (1968), LeBlanc (1971), and Wiessner (1974), between habitation area variables and population, are other good examples. Although some of these correlates are imports, others have been devised or refined by archaeologists.

Correlates containing organizational variables and material and/or spatial variables are difficult to uncover, though it is certain that they are in widespread use. Whenever the distribution of exotic materials is used to infer a trading network, or a piece of monumental architecture is used to infer a prerequisite labor force, correlates of this type have been employed. Based on present observations, these laws could stand to undergo substantial explicit elaboration and testing. Study of these organizational correlates will probably fall primarily to archaeologists.

LAWS OF CHANGE

Laws of culture change and diversity form the core of what most archaeologists believe is theory in archaeology (e.g., Chang 1967; Willey and Philips 1958). Two conceptual frameworks, diffusionism and cultural materialism, now compete for dominance in the conceptual repertoire of archaeology. The comprehensive explanatory system of diffusionism is composed of many laws. Most of them can be traced back to the cultural evolutionists of the 19th century, like Tylor and Spencer, to the anthropogeographers like Ratzel, or to

the extreme diffusionists early in this century, like Smith and Perry. In the hands of the Boasians the laws of diffusion were integrated into a system purporting to explain all cultural variability and change. But as cultural anthropologists, under the domination of functional and psychological emphases, turned their attention away from historical studies in the third and fourth decades of this century, it remained for archaeologists to refine the old and in some cases to generate the new laws of diffusion. The following are fairly typical examples:

> The greater the distance between groups in time and space, the more unlikely it is that diffusion would take place between them [Sanders and Price 1968:59].
>
> Cultures developing in isolation will normally change less rapidly than those with more extensive cultural interrelation [Griffin 1956:48].
>
> . . . specific items are more likely to be lost and more rapidly lost than broad, varied activities or large systems . . . they are also accepted more rapidly [Wauchope 1966:26].

Although the explanatory efficacy of these and the remaining laws of diffusion is in question, there is no doubt that many archaeologists have made substantial contributions to the diffusionist framework. With the expenditure of a small effort, diffusion theory and its laws could be systematized and formalized.

The materialist scheme now replacing diffusionism has its roots in systems theory, ecology, and cultural evolutionism (Watson, LeBlanc, and Redman 1971). Unfortunately, these intellectual currents have not yet coalesced into a coherent explanatory framework, but a number of laws are explicit and can serve as examples:

> The greater the size of the organized labor force required . . . the greater the necessity that formal patterns of authority be established [Sanders and Price 1968:176].
>
> Increasing dependence on agriculture leads to increasing social distance between the minimal economic units needed to make agriculture a successful economic base [Leone 1968:1150].
>
> . . . where there is a marked contrast in degree of sedentism between two sociocultural units within a relatively restricted geographical region, there would be a tension zone where emigrant colonies from the more sedentary group would periodically disrupt the density equilibrium balances of the less sedentary group. Under these conditions there would be strong selective pressure favoring the development of more effective means of food production for both groups within this zone of tension [Binford 1968:332].

Many laws of the materialist framework have been borrowed from outside archaeology. Leone's Law, for example, can be traced to Sahlins (1958), and perhaps back to Marx. But many others, such as the one Binford proposed, have been invented or reinvented and tested by archaeologists as needed for the solution of archaeological problems. I also expect that the archaeologists who are now avidly borrowing principles from general systems theory and ecology will soon come to realize that the features and principles that cultural systems share with amoebae, carrots, and ponds are not nearly so interesting as the emergent properties and laws that are unique to cultural systems.

Several archaeologists and a number of cultural anthropologists have argued that it is in the domain of the laws of socio-cultural variability and change that archaeology is most likely to make a contribution to the other social and behavioral sciences. While correlates and c-transforms are useful for the study of the past, the discovery of significant laws of socio-cultural change would attract the notice of social scientists in other fields. Leone (1968) and F. Plog (1973, 1974), among many others, suggest that the archaeological record provides a unique laboratory for examining the interaction of variables through time to test models of long-term change. One can scarcely read *The Rise of Anthropological Theory* (Harris 1968b) without feeling that the entire book points to the potential archaeology holds for investigating what Harris calls "the laws of history."

CONCLUSION

Within the past decade a growing number of archaeologists have begun to address themselves to a series of new questions for which they seek to use archaeological data. In attending to questions about cultural evolution and adaptation, site location, and social organization, among many others, a demand has been created for the development of a broad range of laws in domains of phenomena that have not been systematically examined by other scientists. Because archaeologists make behavioral and organizational inferences, they require laws relating behavioral, organizational, material, spatial, and environmental variables. Because archaeologists use data subjected to various cultural and noncultural formation processes, they require c-transforms and n-transforms. And because archaeologists attempt to explain variability and change in past cultural systems, they utilize laws of cultural change.

Since few social anthropologists are likely to undertake the studies needed to establish these laws, and in fact ethnographies appear to be becoming less useful to archaeologists than was once the case, it is likely that more studies of living communities, and more experimental researches of all types, will be undertaken by archaeologists with the express purpose of originating and/or testing laws. Nor is it likely that chemists and geologists will conduct the research and experiments needed to establish n-transforms, so archaeologists will doubtless be carrying out more of these studies, too. Those who seek to expand the current frontiers of knowledge of the past will find themselves simultaneously expanding the frontiers of science—especially behavioral science. Since the research and experimentation needed to establish various kinds of archaeological laws are only in their infancy, and archaeologists cannot for the most part simply borrow useful principles, it is likely that by carrying out these nomothetic studies themselves, at least some archaeologists will be behavioral scientists.

A basic question raised by Trigger (1970) still remains: "what are the aims of archaeology as an organized discipline?" That is, as he has phrased the question, is archaeology primarily history or primarily science? This question provokes answers that can only be considered pretentious at best. I believe that Lamberg-Karlovsky (1970:111) has stated well the position taken here, namely that the aims of archaeology are " . . . equal to the sum of the aims of archaeologists and prehistorians at any one time." Because these aims differ at the present time, and are likely to differ in the future, there is little reason to attempt to establish the nature of archaeology by legislation. Archaeology can enjoy hybrid vigor by nurturing both its historical and behavioral science roots. Archaeology will be history as long as historical questions continue to be asked. Archaeology will be behavioral science as long as the answering of historical *and other* questions leads the archaeologist to invent and test nomothetic statements in domains that have not been appreciably explored by other behavioral scientists.

NOTES

[1] An earlier version of this paper was read at the 36th Annual Meeting of the Society for American Archaeology, Norman, Oklahoma, in May 1971. I thank David R. Wilcox for criticism of that paper. I also thank Patty Jo Watson and several anonymous reviewers for suggesting useful changes to an earlier draft of the present version. The research referred to in this paper was undertaken while the author held a National Science Foundation Graduate Traineeship in the Department of Anthropology at the University of Arizona.

[2] A kindly but anonymous reviewer of this paper suggested that the disciplinary affiliation of the law-producer (or the laws themselves) is irrelevant in arguing for the scientific nature of archaeology. By that view, I need only show that archaeologists make use of a distinctive class of laws. While this may be true, I am deliberately emphasizing that archaeologists are *originators* of laws in order to dispel the widespread notion that we are chronically

dependent on the creative energy of other sciences (see also Reid 1973). To succeed, however, my presentation need not demonstrate that *all* laws employed by archaeologists are also generated by them or are unique to archaeology. The discussions and examples which follow acknowledge fully that many laws used by archaeologists are contributed by other disciplines or are related closely to laws in those disciplines.

[3]The term "inference" is used in the remainder of this paper to designate both the process of acquiring knowledge of the past and the end-product of that process.

[4]This discussion of cultural formation processes has been drastically simplified for present purposes. More detailed discussions of the variety of cultural formation processes can be found elsewhere (Schiffer 1973a, 1975).

[5]Hill (1966, Table 6) uses the term correlate in a way similar to the present usage, though it is not entirely clear in his writings that correlates must pertain only to systemic context phenomena. At any rate, I have almost certainly adapted the term from Hill's work.

[6]An appreciation for the role of laws in archaeological explanation does not require a commitment to any specific model of scientific explanation, since most such models require relational statements possessing the properties of laws. Thus, the present account of inference is compatible with models of scientific explanation as diverse as those proposed by Hempel (1966) and Salmon (1971).

[7]Some of the assumptions on which this law is based are present elsewhere (Schiffer 1973:102), and examples of its use in reconstructing systemic variables are in preparation.

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