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Archaeological Analysis and Concepts of Causality

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Article abstract

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Archaeological Analysis and Concepts of Causality

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The explanatory power of archaeological data is determined by the kind and degree of regularities in socio-cultural phenomena. This paper discusses current anthropological views that are relevant to prehistoric archaeology with respect to four dimensions of freedom or constraint: the role played by rational calculation, the degree of systemic regularity, the relative importance of deterministic foci, and the degree of systemic integration. It is argued that more attention should be paid to this set of problems as part of a broader effort to establish realistic goals for prehistoric archaeology and appropriate methods for achieving them.

La portée explicative générale des données archéologiques est déterminée en dernier essor par le type et le degré de régularité des phénomènes socioculturels. Nous examinons ici quelques approches anthropologiques contemporaines qui sont pertinentes en archéologie préhistorique tenant compte de quatre dimensions de liberté et de contraintes : le rôle de l'évaluation rationnelle, le degré de régularité du système, l'importance relative des sources de détermination et le niveau d'intégration du système. Nous pensons que cette série de problèmes mérite plus d'attention dans le cadre d'une approche élargie des phénomènes socioculturels. Ceci afin d'établir pour l'archéologie préhistorique des objectifs réalistes et de définir des moyens plus appropriés à leur réalisation.

A challenge that confronts all archaeologists who experience difficulties in explaining their data satisfactorily is to differentiate the degree to which the generalizations on which their explanations are based are erroneous or their data sets are biased or inadequate. This problem, as well as closely related ones involving the pseudo-confirmation of hypotheses, must be confronted if the deductive approach is not to be subverted by the accumulation of numerous inadequately tested hypotheses. Yet such problems have so far received very little systematic attention because raising them tends to challenge the exaggerated dichotomy that certain influential American archaeologists have drawn in recent decades between inductive and deductive approaches (Watson, LeBlanc and Redman, 1971: 3-19). A related but deeper problem is whether or not the questions that archaeologists are asking are ones that can in fact be answered by them. In an effort to encourage colleagues to search for more regularities in their data, these same archaeologists have argued that archaeological findings can provide substantial information about all aspects of human behaviour and that shortcomings in our understanding of such data result almost entirely from inadequate theoretical sophistication (Binford, 1968; Sullivan, 1978: 187, 210). This proposition contradicts the practical experience of most archaeologists which indicates that

certain aspects of human behaviour are much easier to investigate archaeologically than are others; and that some, such as language or mythology, cannot be studied to any significant degree. The latter observation leads to the conclusion that archaeology, being based entirely on the study of material culture, is a discipline requiring its own goals and methodology, rather than simply another source of anthropological data (Clarke, 1968). At a deeper level, this problem also involves a set of untested hypotheses about the nature of regularities as they apply to human behaviour. Rather than reproaching themselves for being unable to answer impossible questions, it behooves archaeologists to examine systematically, as part of their ongoing research, the nature of behavioural regularities as they relate to determining what issues can or cannot be satisfactorily investigated using archaeological data. By doing this, much wasted effort may be avoided in the long run. I do not propose in this paper to resolve basic problems concerning the nature of human behaviour that generations of social scientists have failed to answer. I will, however, seek to establish some of the more important dimensions of these problems and by ascertaining what progress has been made to determine the limits within which debate continues.

Archaeological Explanations

In the sections that follow I am assuming that at all times the goal of most archaeological research has been to explain archaeological data in terms of some significant conceptual framework. Along with rejecting the utility of much of the New Archaeology's clear-cut distinction between inductive and deductive approaches, I reject the claim that in the past most archaeological research had merely descriptive or narrative goals and that only a small amount of it aimed to be explanatory (Willey and Sabloff, 1980). Historians such as E.H. Carr (1962: 4-14) have long recognized the total interdependence of description and explanation and have demonstrated that the interpretation that either implicitly or explicitly is accorded to facts determines their narrative significance.

What archaeologists have differed about is the nature of what is being explained. The traditional cultural historical approach sought to explain individual events or processes that were represented in the archaeological record. Processual archaeology, with its positivist orientation, seeks to use archaeological data to test specific propositions about human behaviour and has as its primary goal to establish general laws about such behaviour. Evolutionary approaches, whether historical materialistic or cultural materialistic in orientation, seek to discover

and generalize about trends in cultural change.

Nothing is to be gained from discussing whether each of these approaches is or is not scientific or legitimate. Each of them properly claims such status and counter-claims amount to little more than partisan polemic. What is important is what each of these approaches manages to explain and leaves unexplained. The cultural-historical approach seeks to explain individual situations in all of their complex reality. In order to do this the archaeologist must inevitably draw not only upon hard, or experimentally verified, explanatory propositions about human behaviour, but also upon a considerable number of soft ones. The latter include propositions that have been studied scientifically but for which no unambiguous and conclusive correlations have been established, as well as less reliable ones based on common sense and personal opinion (Dray, 1957). General laws, whether of absolute or statistical validity, achieve a high degree of rigour but do so quite correctly by selecting variables and treating them in isolation from their context. Evolutionary approaches tend to be intermediate in character between the first two. Some attempt to explain only similarities shared by cultures assigned to the same evolutionary class or level, while dismissing differences as fortuitous historical "accidents" (Steward, 1955: 182). To date, however, no scientifically acceptable method has been devised for distinguishing structural regularities from historical accidents. In specific instances many of the latter appear to be of no less functional significance than the former. Other evolutionary approaches, including those advocated by many Marxists, strive to account for both the similarities and the differences that distinguish various types of cultures. While only these latter seek to account for all aspects of human behaviour, such efforts necessarily involve considerable amounts of soft explanation.

Each of these approaches is equally affected by a fundamental unanswered question: how ordered or non-ordered is human behaviour? In practical terms this means what does the archaeologist have to know about human behaviour or products of human behaviour in order to infer a great deal more? Archaeologists with their restricted range of evidence have always had practical reasons for hoping that there is a considerable degree of regularity in human behaviour. This would enhance their ability to carry out their primary task: to use the intrinsic properties of archaeological data, such as material constituents, shape, and decoration, to infer extrinsic features, such as date, function, and social significance (Gardin, 1980: 65-76).

The nature of causality thus becomes a, or possibly the, key issue in the formulation of archaeological

theory. The task confronting archaeologists and what they can hope to achieve are very different if regularities in human behaviour are strong than if they are weak. Problems and expectations are also different according to variations in the degree of regularity in different functional sectors of a culture. Archaeologists have long believed that they can hope to learn much more about all aspects of a culture if the economy plays a leading role in determining the rest of it than if ideology does so; since the economy is represented much more prominently and less ambiguously in the archaeological record. For this reason, optimistic archaeologists have also tended to be materialists.

Neither archaeologists nor social scientists in other disciplines have been able to agree on high level theoretical formulations comparable to the theory of universal gravitation or the synthetic theory of evolution. Most generalizations are inductive. These include the "predictions" that there will be x number of automobile accidents on Canadian highways on a particular weekend. Others tend to be middle range ones, such as the observation that the larger and more sedentary a community is the more formally organized will be its mode of garbage disposal (Murray, 1980). When it comes to high level formulations, what Marvin Harris (1979: 26-27) calls scientific research strategies, one social scientist's truth tends to be another's folly. This manifests itself in vehement and prolonged controversies among the adherents of historical materialism, cultural materialism, sociobiology, structuralism, and other strategies, with many social scientists opting for an often inconsistent eclecticism. There is also no way by which these creed-like strategies can be tested directly. Instead, their truth or falsehood must be ascertained slowly and indirectly by determining, through a process of repeated trial and error, the validity of the middle range theories that are logically related to them (Harris, 1979: 76).

There is also no general agreement among archaeologists about the formal nature of the generalizations that they seek to elaborate. In American archaeology, as within the positivist tradition generally, it is assumed that laws are universal in nature. That means that they provide statements about relationships between variables that are assumed to hold true regardless of the temporal period, geographical zone, or specific cultures that are being studied. This sort of approach is best exemplified by formalist economics, which maintains that the rules which explain the economic behaviour of modern Western societies also explain the economic behaviour of all others. This approach often is interpreted as implying that the uniformities being described reflect an invariant human nature. An example is the stereotype of

economically rational man. This approach accounts for significant variations in human behaviour in different kinds of societies by viewing them as the results of novel combinations and permutations of a fixed set of interacting variables.

Marxists, as represented in Western archaeology by Gordon Childe (1947), maintain that general laws of the sort characterized above are relatively few in number. These are identified as the basic historical laws of Marxist materialism, which assert the causal primacy of the infrastructure, the occurrence of change as the result of social contradictions, and the resolution of such contradictions by means of social revolution. A much larger number of middle level generalizations apply only to societies that share the same or closely related modes of production. This position is similar in its general orientation to that of the substantivists in economics. In contrast to the position adopted by the formalists, it implies that rules as well as forms are fundamentally altered as a consequence of historical change. It also implies that novel behavioural properties can and do emerge as a result of sociocultural change and that human nature can be transformed as a result of it. At the lowest level are generalizations that hold true for only one specific society. Julio Montané (1980: 136) cites as an example of such generalizations a formulation of the rules governing concepts of beauty in classical Greek art.

There is currently some evidence of growing sympathy for a more flexible view of regularities among American archaeologists. Richard Gould (1978: 251) in his ethnoarchaeological research draws a distinction between *laws*, which describe variables that are constant in time and space, and *processes*, which can change over time. His formulation is vague, however, by comparison with those of Marxists and substantivist economists.

Even if we accept the distinction between universal and more specifically applicable generalizations, it remains uncertain how wide a range of regularities are of a universal type. In addition to Marxist laws of history, the high level regularities subsumed under general systems theory and general ecology and middle range ones referring to the disposal of garbage might all qualify as examples of universal generalizations. Moreover, the distinction between universal generalizations and more restricted ones may not be as absolute as its proponents maintain. Sometimes a number of restricted generalizations may be subsumable under a single universally applicable law. Other restricted generalizations may be rewritten so that they apply generally, while universal generalizations may be reformulated, usually in greater detail, so that they apply specifically to a particular class of society. It is by no means clear whether the principle of non-proportional change (Boulding, 1956), that

William Rathje (1975) has used to generalize about certain aspects of changes in the scale of complex societies, is an example of universal or restricted generalizations. It can be interpreted as both. Yet those who stress the importance of restricted generalizations deny that all or most of them can be transformed into universal generalizations.

What is of pragmatic significance is whether more understanding is to be gained by moving in one direction or the other. Those who believe in the plasticity of human nature and see cultural changes as bringing about major alterations in human behaviour will tend to regard restricted generalizations as being more realistic, productive, and informative than universal ones. Those who believe universal laws to be the only valid ones will interpret such a development as a lowering of scientific standards and an unhealthy retreat into inductivism.

The major analytical concepts that are used by archaeologists have not been narrowly defined either by them or by other anthropologists. While abstractions, they do not qualify as strictly scientific concepts. Archaeologists study the products of human behaviour in the past. Yet in most instances (for exceptions see Hill and Gunn, 1977; McGhee, 1980), it is impractical as well as not particularly informative to try to understand the past in terms of individual human behaviour. Instead, in an effort to understand their data, archaeologists employ the concepts of culture and society. Many of them define culture as humanity's "extrasomatic" means of adapting to its environment. "Extrasomatic" generally refers not only to technology but to all learned as opposed to innate aspects of human adaptation. The definition is complicated by the fact that there is no generally accepted procedure for distinguishing between learned and innate behaviour, although this has not been seen as creating many practical difficulties by most archaeologists. More importantly, this definition is not accepted by archaeologists who either reject its materialist implications or, while accepting a materialist orientation, believe it unproductive to analyse all aspects of human behaviour in terms of their adaptive significance. Anthropologists are in fact far from agreed that all facets of culture are adaptively significant (*cf.* Vayda and Rappoport, 1968; Kirch, 1980: 111; Dunnell, 1980: 89).

To most social scientists culture implies patterns of behaviour that are both learned and ideational. Many archaeologists refrain from carrying this analysis further by speaking about sociocultural systems, by which they mean patterns of interaction based upon learned behaviour. Within this framework they conceptualize cultural systems as made up of various interconnected subsystems, although individual archaeologists define both the subsystems and their

interconnections differently (Binford, 1962; Clarke, 1968; Renfrew, 1972). The principles on which these classifications are based have not been expounded in a systematic fashion. Some archaeologists have expressed doubts about the utility of the concept of culture and have advocated that prehistoric data be analysed in terms of social systems (Trigger, 1968a: 15-60, 1968b; Renfrew, 1973a, 1978). The latter are conceptualized as consisting either of the observable interactions of human beings as members of society or the patterns of interaction that can be inferred from observing such activities. Archaeologists must, in any case, begin at least one step further removed and infer activities from patterned material remains. Within this framework, technological skills, knowledge of the consequences of social acts, beliefs, and values are treated as items of culture that acquire a functional significance in terms of their relationship to the social system. A societal approach to the analysis of archaeological data was at first associated with the economic archaeology of Grahame Clark (1952) and with settlement archaeology (Trigger, 1967). In recent years, it has become increasingly popular within the context of American processual archaeology, where social systems have tended to some degree to replace cultural ones as foci of interest (Redman *et al.*, 1978). This approach leaves open the question of whether culture itself is a miscellaneous collection of ideas that acquire their functional significance only from their individual relationship to the social system or whether, as cognitive maps or in terms of deep structure, it has structural or systemic properties that deserve study in their own right. So far the study of culture as a cognitive system has made little sustained progress in archaeology (Deetz, 1967).

Dimensions of Constraint

Despite seeming assertions to the contrary, especially by hyperdiffusionists earlier in this century, the commonplace experience of human behaviour indicates that it is not completely random. The question remains, however, how ordered is it? Is it highly regular, in the sense that most aspects of human behaviour can be accounted for in terms of a limited number of regularities? Or is it ordered to a degree that falls only slightly short of randomness or chaos? Gould (1980: 51) asserts that if archaeologists are prepared to admit the existence of residual factors that their theoretical constructs do not explain they are not being deterministic. It is clear, however, that the degree and nature of constraints on human behaviour are vital factors that in the long run will determine the ability of archaeologists to explain their data.

The analogy of biological evolution suggests that

human behaviour must be sufficiently orderly to ensure an adaptation that permits the survival of the group. Yet it is unlikely to be ordered to such a degree that every aspect of such behaviour would be ideally adjusted to serve such an end, as many social anthropologists and archaeologists have believed (Murdock, 1949: 196-198). Indeed, the resulting lack of alternative modes of behaviour would not promote the long-term survival of the group in the face of changing conditions. It would seem to be as unrealistic to seek totally purposeful order in human behaviour as to deny wholly the existence of such order. Instead, the challenge is to determine the amount and nature of such order and the degree to which societies vary among themselves and through time in this respect. To do this we propose to examine the problem of regularities in human behaviour and sociocultural processes in terms of a number of different dimensions:

(1) THE ROLE PLAYED
BY RATIONAL CALCULATION

The first of these dimensions is concerned less with the degree of constraint than with the identity of the factors that produce orderly and hence predictable human behaviour. On the one hand, constraints have been identified with the employment of reason to increase the controls that human groups exercise over nature. Faith in the capacity of reason to improve the human condition was a fundamental tenet of Enlightenment philosophy and of nineteenth century evolutionary anthropology. This doctrine was all the more persuasive because it maintained traditional Christian and Western European concepts of reason and free-will as essential, God-given human attributes. There was, however, the fear that because reason appeared free from external constraints, its study could not provide a scientific explanation of human behaviour. Hence late in the nineteenth century many social scientists began to view such behaviour as being governed to a considerable degree by forces of which individuals were unaware and which therefore were not subject to their conscious control. These included environmental factors, as embodied in various doctrines of geographical determinism; the subconscious, as developed in Freudian psychology; custom, as employed by E. B. Tylor and other anthropologists and elaborated by A. L. Kroeber's concept of super-organic culture; and finally society, as conceptualized by Emile Durkheim and British social anthropologists. Each of these approaches sought to make human behaviour an object of scientific study by showing it to be controlled by factors other than reason and accounting for how these factors operated (Sartre, 1963). In particular, this led anthropologists to elaborate the concepts of society and culture as key

determinants of human behaviour.

At present, anthropologists hold varying opinions concerning how rational human beings are and how much their behaviour is determined by their cultural environment. Boasian anthropology stressed a maximum plasticity of human behaviour and personality. These were believed to be determined largely by patterns of individual cultures, each of which was explained, in turn, largely as an historical accident. Of all options, the various forms of materialism present in anthropology have continued to lay the greatest stress on rationality. To a considerable degree they view human beings as calculators who seek to maximize returns and minimize risk and effort in their individual and collective exploitation of the environment. Recent archaeological studies based on the assumption of rational behaviour are found in Colin Renfrew and K. L. Cooke's (1979) *Transformations: Mathematical Approaches to Culture Change* and the ecological catchment analysis that was pioneered by Eric Higgs and his co-workers (Higgs and Vita-Finzi, 1972). If significant aspects of human behaviour are determined by rational calculation, this is highly favourable for archaeological analysis. It is far easier for archaeologists to replicate calculations that are not culturally bound than it is to decode the idiosyncratic presuppositions of alien and extinct cultures.

Yet, even if rational calculations are a prominent feature of human behaviour, it must be empirically determined on how complete and reliable a basis of knowledge individuals were able to act in each culture. It seems likely that many crucial ecological and political decisions had to be made on the basis of highly imperfect knowledge concerning major relevant factors. This is especially true with respect to the longterm consequences of actions that had to be taken rarely or under rapidly changing circumstances (Adams, 1975: 453-454). Hence even when studying circumstances in which rational calculation clearly played an important role it is impossible for archaeologists to escape completely from culturally-specific factors that complicate an understanding of prehistoric human behaviour. This is true even if it is accepted that in the long run economic and ecological selection will to some degree tend to favour "rational" choices.

Although Boasian historical particularism has been largely abandoned, there remain many kinds of approaches that attempt to explain human behaviour in terms other than those of conscious reason and self-interested calculation. Most of these are reductionist in orientation. Sociobiology attempts to explain human social behaviour in terms of biological formulations. Many cultural ecological approaches try to do the same using principles derived from general ecological theory as the latter has evolved

within the context of the biological sciences (Hardesty, 1980). These principles are not necessarily antithetical to a rationalist interpretation of individual human behaviour and may even help to understand it.

In recent years, however, archaeologists have been particularly active in using concepts derived from general systems theory to explain as well as to describe or model human behaviour (Flannery, 1967; Watson, LeBlanc and Redman, 1971: 61-87). This approach is based on the conviction that important aspects of human behaviour, society, and culture are shaped by the same forces as mold any other system, whether its nature be human, biological, physical, or artificial. By understanding the properties common to all systems, it is thought possible to understand the systemic aspects of sociocultural behaviour. This approach is of great philosophical importance because it suggests a level of constraint on human behaviour that was unforeseen by traditional social anthropologists, who analysed it as being constrained externally only by the physical and behavioural characteristics of human beings as a species.

A major problem that has yet to be resolved in using systems theory to explain human behaviour is whether its constraints are immediate or must be mediated by species-specific characteristics. For example, if the size of a group determines the basic configuration of political structures concerned with information processing, can the size thresholds be predicted from information theory alone or does some aspect of human nature intervene which requires that these thresholds be empirically determined? Anthony Forge's (1972) estimate of 300 people as the maximum size of a group within which informal decision-making can go on is an empirical one. Could such figures be predicted from information theory alone? The answer to this question has important implications for social science theory in general. Yet, whether or not its quantitative elements must be empirically adapted for social science investigation, if systems theory has the potential for becoming an important source of information about regularities in human behaviour, it will offer a growing number of insights that are of value for the interpretation of archaeological data.

(2) REGULARITY IN THE MANIFESTATION OF CONSTRAINTS

This dimension measures the degree of variation that exists among total cultural systems. It also measures the degree of regularity in sociocultural processes; in particular point by point parallelisms in different lines of development. While it does not address the reasons for observed degrees of uniformity or variation, this dimension is a major factor in

the conceptualization of the problems that must be addressed.

The variation along this dimension has been seen as extending from a unilinear position, in which all variations among cultures represent stages in a single line of development, to an opposite view in which, as a result of historical accidents and subject to providing for enough vital pre-requisites to keep a population functioning, any combination of variables could occur in a particular culture. This was, of course, the position favoured, though with recognition of some of its limitations, by Boasians such as Robert Lowie (1936). Its adherents in an effort to refute evolutionary theories sought to demonstrate that any kind of social or political organization could correlate with any sort of economic regime.

During the last one hundred years anthropologists have radically shifted their position with respect to this dichotomy. In the middle of the nineteenth century, most of them espoused a relatively straightforward version of unilinear evolution. Between 1880 and 1945, this gave way to an equally extreme historical particularism as represented in the work of Boasian anthropologists and the hyperdiffusionists. Since 1945, neo-evolutionary theory, largely inspired by the work of Leslie White and Julian Steward, has marked a reaction against historical particularism, but one that has avoided the excesses of older forms of unilinear evolution. More recently, a systems theory approach has been used to stress once again, though in a sophisticated and nuanced fashion, the complexities and irregularities of sociocultural phenomena (Leone, 1975: 197). It should also be noted that the amount of observable regularity that has been postulated by these approaches does not correlate with the simplicity or complexity of the causal factors that have been invoked to account for it. Nineteenth century unilinear evolutionary schemes tended to be descriptive and were non-committal or confused about causal factors. Neo-evolutionists, by contrast, have tended to prefer a simple causality largely based on technological, ecological, or economic criteria (Harris, 1979: 63).

It now seems clear that neither the extreme of unilinear evolution nor historical particularism is tenable. Cross-cultural regularities indicate significant amounts of parallel development and structural similarities among historically unrelated societies at similar levels of development. Yet the similarities are never total. Nor is it possible to dismiss the differences as being irrelevant in terms of structure and function (Trigger, 1979). Archaeologists are by no means agreed about the degree of regularity in cultural development or about the nature of its associated causality. Mark Leone (1975) has suggested that the use of systems theory as an analytical

device is a way of avoiding the issue of causality and of trying to restore a Boasian-style inductivism within the context of processual archaeology. Sanders, Parsons and Santley (1979: 360) suggest that useful theory must be simple and in their monograph on the evolution of settlement patterns in the Valley of Mexico search for four or five factors that will explain 80 percent of the significant variation in their data. They candidly admit, however, that they cannot do this at present but suggest that if enough factors could be adequately quantified (as systems analysts seek to do) systemic models would become multilinear, if not unilinear. This suggestion is based on a belief in underlying regularities that is stronger than that which seems to be implicit in most systems models.

(3) DETERMINISM

Determinism implies a source or direction of causality. It is concerned with the degree to which one part of the sociocultural system determines the nature of the rest. Hence it too constitutes a dimension of freedom and constraint. Boasian anthropologists and other historical particularists generally denied the existence of determining factors or suggested that they were so weak that a vast amount of empirical research would be needed to demonstrate their existence and that such knowledge when found, would be of little practical use for understanding human behaviour. Other anthropologists have ascribed varying degrees of determinacy to technology, ecology, ideology, and various types of social relations. Because social relations have closer ties to both ideology and the economy than the latter two have to each other, social organization can play a flexible role in thinking about causality. This flexibility has been exploited to advantage by Karl Marx, Emile Durkheim, and in archaeology by R. M. Adams (1966). As we have already observed, a large number of archaeologists tend to be materialists, either opportunistically or by conviction, since this approach enhances the significance of those categories of data that are most abundantly preserved in the archaeological record and most easily understood by them.

Yet archaeologists continue to espouse a wide variety of views concerning the direction of causality. The narrowest view formulated in recent decades was Leslie White's (1949: 368-369) assertion that technology determines the general nature of the rest of the sociocultural system. Although for a time archaeologists such as B.J. Meggers (1960) and Stuart Struever (1968), who were strongly influenced by White, viewed technology and environment as the crucial variables for understanding prehistoric cultures, this approach is now obsolete. Considerable attention is still paid, however, to the proposition that

in a general way the economy determines social structure, while the two together in turn shape the belief system and ideology. It is argued that the economic aspects of human behaviour are the most narrowly constrained because they are the most directly concerned with coping with the environment. Social organization is constrained by the requirements and limitations of the economy but, in spite of that, has more freedom for random variation, while beliefs and ideology have even greater freedom. This view is commonly held by British archaeologists who have been influenced by the Durkheimian social anthropological tradition, such as Grahame Clark (1970), or by the Marxist tradition, such as Childe (1936: 110) and M.J. Rowlands (Friedman and Rowlands, 1978: 203-204). These archaeologists view economic factors as determining the rest of the sociocultural system only in the sense that they limit the possible range of variation in social organization and through social organization in ideology. This also implies that while economic similarities can account for other similarities in a number of social systems at the same general level of development, they cannot account for the differences among them. This emphasis on limitations as an explanatory device also means that a wide range of alternative social or ideological attributes may be functionally associated with a particular type of economy.

Marxism asserts that the infrastructure or base of a society in some manner determines its superstructure. The latter concept embraces family organization, the state, legal systems, and ideology. The infrastructure denotes how people work together to utilize their environment. It consists of the relations as well as the means of production. Thus it includes technology, technological knowledge, manpower, and significant elements of social interaction. To state that the base determines the superstructure is in effect to claim that approximately one half of sociocultural reality determines the other half. In this respect, Marxism is less deterministic than White's technological determinism or even the relatively broad economic determinism associated with cultural materialism (Childe, 1946: 250).

Childe (1936, 1942) specified in detail some additional implications of a Marxist approach, though he did not always use Marxist terminology to do so. In his view, progressive change occurred in societies that had beliefs and values as well as a political organization that were able to respond positively to economic changes and to encourage them. Yet he also maintained that reactionary political regimes and systems of beliefs and values often had the power to delay or completely block change over long periods of time. They could only do this, however, at the cost of weakening a society's ability to cope with rival ones or

with a changing natural environment. Hence Childe did not discount the power of the superstructure to influence history. Instead, he asserted that it could only influence history negatively by delaying or preventing change. Yet in this perspective the real influence of the economic base upon history becomes even more restricted and nuanced. Among materialistic approaches, historical materialism is one of the least narrowly deterministic.

Some archaeologists interested in information theory have maintained that ideology and social organization may have a major effect on economics and subsistence patterns because they are vehicles for the storage and transmission of the information by which the system is regulated. From this point of view, no one level necessarily determines the others (Flannery, 1972).

Finally there are archaeologists, such as Christopher Hawkes (1954) and Nancy Sandars (1979), who explicitly repudiate the legitimacy of a materialist view of human behaviour. They believe that archaeology, insofar as it reveals most about prehistoric economic behaviour, is capable of studying in detail only the most generically animal rather than the more specifically human aspects of prehistory. It is limited by the nature of its evidence to examining the least interesting aspects of human behaviour and is unable to explain what truly motivated human beings in prehistoric times. Being unable to gain more than a superficial understanding of the beliefs and values that animated prehistoric peoples, archaeologists are unable to understand why these peoples behaved as they did.

It is clear that social scientists are not agreed concerning what, if any, portion of the sociocultural system exerts a privileged influence over the rest of it. Narrow and univariant explanations of cultural change now seem generally to be discredited but beyond that little is certain. There is not much evidence as yet that would help to determine whether less narrowly deterministic theories appear to work better because they more closely approximate reality or because they lack rigour and are therefore harder to refute. It also becomes evident, especially with respect to theories that do not posit a narrow determinism, that the distinction between materialism and idealism is not one of irreconcilable opposition. Instead they constitute opposite sides of a continuum which overlap and become indistinguishable in the middle.

(4) SYSTEMIC INTEGRATION

A final dimension concerns the degree to which the various elements that compose a sociocultural "system" are integrated and therefore interact with each other. This is a different question from the focus

or direction of causality or the overall manifestations of regularity that we have already discussed. It is possible for a system to be tightly integrated but for no one part to have a privileged role in determining the rest of it. Alternatively, one part can be more deterministic than the rest, yet the overall integration of the system loose. This possibility is often invoked as a justification by determinists who are unable to demonstrate a satisfactory level of regularity in their data. More extreme solutions would posit either a system that is tightly integrated and has one or a few sectors that are highly deterministic of the rest or one that is very loosely integrated and has no especially deterministic parts. These two options would embrace most unilinear formulations and most historical particularistic ones.

The concept of culture as a system made up of parts that are functionally interrelated, so that changes in any one part bring about changes and adjustments throughout the entire system, is an assumption that archaeologists have inherited, almost without being aware of it, from social anthropology. This view has been reinforced in recent years by analyses influenced by general systems theory, which also posits that cultural systems are made up of a set of functionally integrated subsystems. Yet modern terminological conventions cannot disguise the fact that this view of society is essentially similar to the original presumption of an analogy which claimed that each society is like an organism. Moreover, neither this presumption nor the natural applicability of any systems model for sociocultural analysis has ever been demonstrated to be a fact. Nor does the survival of individual systems prove that all their parts are positively adaptive, as many cultural materialists tend to assume (Diener and Robkin, 1978). Not until the relationship between the different parts of a culture can be quantified in detail will it be possible to determine whether alternative arrangements would provide more or less satisfactory solutions to the same problems. Even this would not permit archaeologists to evaluate systematically solutions involving major substitutions of components. Under these circumstances, the basic concepts of system and systemic integration remain metaphors or hypotheses rather than established facts.

Because of this, an important objective of archaeological and ethnological research should be to determine how well integrated sociocultural systems actually are. Are they really systems in the traditional social anthropological sense and as systems theory postulates? Or are they only looser interaction patterns that must provide for certain functional prerequisites, such as food, shelter, and child-rearing, at a level which permits these societies to operate and survive but which beyond that can tolerate a large amount of randomness, redundancy, and even

contradictions? At least some prominent social scientists believe that this alternative is a likely one (Aberle *et al.*, 1950).

It may be very difficult to determine which of these models is more appropriate. Loose interaction patterns and tightly integrated systems are only the opposite ends of a continuum, any point along which may correspond to reality and some societies may be more integrated than others. Yet if cultures are not at least moderately integrated systems, archaeologists and anthropologists have long been misled by viewing an untested hypothesis as an axiomatic truth.

Diffusion

The degree to which the various components that constitute a sociocultural unit are functionally integrated is intimately related to the susceptibility of these units to external influences. In recent years, archaeologists have paid little systematic attention to the interrelationships among societies in prehistoric times. Instead they have preferred to concentrate on trying to understand their internal functioning. Despite major differences in their general orientation, Julian Steward (1955: 182) and K.C. Chang (1962: 190-191) agree that every borrowing from one culture to another must be viewed as constituting an independent recurrence of cause and effect. This means that for purposes of historical and functional analysis instances of diffusion can be studied as if they were acts of independent invention within the recipient culture. David Clarke (1979: 94) has compared the sort of stress that Colin Renfrew (1973a, 1979a) and other archaeologists have laid on autonomous development to the "archaic" theory of spontaneous generation in biology. Like American neo-evolutionists, Renfrew views societies as being severely limited in their combinations of economic, social, and belief patterns.

Martin Wobst (1978) has challenged this view. He points out that modern hunter-gatherer societies are invariably part societies that are not only restricted to relatively poor environments but also linked in many ways to more advanced neighbouring ones. There is also evidence that most agricultural societies at a tribal level were heavily influenced by contact with Europeans or with other more complex societies prior to being studied by ethnologists. It is therefore far from certain that the similarities exhibited by such societies necessarily reflect the pristine nature of hunter-gatherer or tribal societies rather than the common influences of acculturation (Fried, 1975). It is a major task of archaeology to determine empirically the degree to which modern hunter-gatherer or tribal agricultural societies resemble Palaeolithic or Neolithic ones.

Similarly while early states appear to be reinforced by the development of a formal, hierarchically-organized religious system to the extent that such institutions are a feature of all early civilizations (White, 1959: 303-328), there is no evidence that indigenous structures of this sort were developing in the kingdoms or lordships of Anglo-Saxon England. Yet these developing states were provided with such institutions through the conversion of their kings to Christianity. While helping to stabilize these states and to promote the unification of England by providing their rulers with a literate and well-trained bureaucracy, Christianity altered Anglo-Saxon law, property relations, economy, and concepts of kingship in conformity with its own needs and ambitions. There is no evidence to suggest that the social organization of Anglo-Saxon England would have evolved along the same general lines had Christianity not been grafted into English society, not merely as an alien set of ideas but at first as a highly organized alien institution (Trigger, 1978: 216-228).

Observations of this sort have important theoretical implications for ethnographers and archaeologists. If all the component parts of individual societies were tightly integrated, each borrowing of an idea from another culture would be, as Steward claimed, an independent recurrence of cause and effect. If integration is looser, the "historical accidents" resulting from diffusion may play a much more important role in shaping cultural development and even historically unrelated societies that have similar modes of adaptation will tend to exhibit considerable diversity in their other features (Schneider, 1977; Godfrey and Cole, 1979). It is, of course, likely that if a society is loosely integrated, the repercussions of a particular diffused complex often will be restricted to one or a few spheres. Hence the looser the integration, the more piecemeal the diffusion and acceptance, and the more circumscribed the effects.

Yet, while numerous regularities are evident in the historical, archaeological, and ethnographic record, it is not clear that these are greater than could be accounted for in terms of functional pre-requisites rather than a more thorough-going systemic integration. The evidence also suggests considerable diversity in all aspects of a culture of the sort that is likely to arise from the operation of diffusion (Driver and Massey, 1957; Driver, 1974). Without compelling us to become historical particularists, this suggests that social systems are in fact less tightly integrated than many current analyses tend to assume. It also suggests that no society can properly be understood or even accurately classified without determining its historical relationship to other societies; as those who study "world systems" increasingly realize. History constitutes an essential matrix for understanding structure.

Renfrew (1979b: 17) has argued that archaeologists have spent too much time classifying types of structure and too little time establishing types of change. Catastrophe theory has been suggested as one possible source of models of change. Yet in his study of kinship terminology, G.P. Murdock (1949) argued that the number of viable structures of kinship are far less than are the ways of getting from one type to another. Childe (1951) advanced the same argument with respect to the development of civilization. He and some other anthropologists (Sebag, 1964: 176-179) have argued that over time a strain for consistency between the base and the superstructure will result in historically unrelated societies slowly becoming more alike in terms of their overall social organization and general cultural patterns. In the shorter run social change is influenced by differing initial conditions, historically-specific patterns of diffusion and perhaps the idiosyncratic effects of "great men" and chance conjunctures. Indeed cultural change is viewed as taking place so quickly and cultural selection generally occurring so slowly that perfectly integrated societies are unlikely ever to occur. This approach, which does not suggest that societies possess tightly integrated sociocultural systems, does imply, however, that sociocultural change is more complex and multilinear than are the basic types of society. Hence the relationship between structure and change may be such that understanding either one may not be a logical prelude to understanding the other. Once again, the integration of both approaches may only be possible within a concrete historical matrix.

Conclusion

What archaeologists are able to achieve by way of explanation depends in part upon how hard they are prepared to work at recovering and analysing data and the kinds of resources that are at their disposal. It also depends, however, upon the intrinsic nature of the phenomena they are trying to understand. Ideological commitments inevitably introduce a subjective bias into the study of human behaviour. Yet if archaeologists are not to waste much time and effort, attempts must be made to acquire a more realistic understanding of the general nature of sociocultural phenomena. It is not suggested that the subjective biases that influence the interpretation of data can be overcome in this manner. Indeed, for this reason, archaeologists as a group are probably well advised not to pursue a single research paradigm. Yet efforts can profitably be made to narrow and specify the various dimensions of disagreement. As this is done, archaeologists, regardless of their theoretical bias or personal ideological commitment, will be able to

assess more accurately what kinds of questions it is profitable for them to ask and how archaeology can best contribute to the study of human history and behaviour.

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