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Towards an Integration of Ecological
and Social Approaches

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9. CONCEPTS, TIME-SCALES AND EXPLANATIONS IN ECONOMIC PREHISTORY

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Introduction

Examination of the literature of economic prehistory¹ during the past forty years illustrates the extent to which the emphasis in interpretation has tended to fluctuate between 'social' and 'ecological' explanations. An implicit feature of the various arguments advanced in favour of one or another point of view has been the differing nature of assumptions about the effect of time-scale and time duration on the processes under study. In this paper I shall argue that an essential step towards an integrated approach lies in appreciating the historical character of economic prehistory, historical in the sense of a discipline concerned with processes and relationships over time, and hence with the effect of time duration on behaviour patterns and our observation of them. Economic prehistory is capable of revealing processes operating over long time spans as well as shorter ones, and hence of specifying the difference of perspective and focus imposed by different time-scales. Much of the opposition between 'economic' and 'social' archaeology involves argument at cross-purposes through failure to clarify this effect. Palaeo-economic theories, stressing biological and ecological factors, are concerned primarily with long-term trends and the long-run consequences of human behaviour; sociological theories have concentrated mainly on behaviour over short time-scales, particularly the motivations, values and thought processes that lie behind observed behaviour patterns, or else with attempts to extrapolate to the longer term record of prehistory theories and concepts designed for the study of contemporary behaviour.

What is Economic Prehistory?

Economic prehistory has been formally recognised as an explicit approach to the study of the prehistoric past for over thirty years (Clark 1946; Heyman 1944), while a more general interest in economic matters can be traced in earlier writings (Daniel 1975). The term economic prehistory has been used in a general sense to characterise all attempts to describe and understand the economic life of prehistoric communities. As such, it is not a clearly bounded field of study, since its interests cut across ecological and evolutionary concerns on the one hand, and social, cultural and historical ones on the other; some, at least, of its objectives and methods have been shared by those who would not regard themselves as economic prehistorians or even archaeologists; and self-styled economic prehistorians, notably Grahame Clark himself, have made contributions to many other problems of archaeological importance. Nevertheless, economic prehistory as a central focus of study has been advocated perhaps most consistently and explicitly during

the past forty years by Cambridge-based or Cambridge-trained archaeologists. This is not to overlook the influence or importance of similar work elsewhere, especially in the Americas or the Soviet Union, or the West European tradition of environmental archaeology, or to deny the other achievements of Cambridge archaeology during this period, but rather to single out a local tradition which highlights some of the issues raised in studying prehistoric economies.

Broadly two distinct tendencies can be discerned in this development. The first is exemplified in the founding work of Grahame Clark, whose interest in economy reaches back to at least as early as 1939 according to his own account (Clark 1939, 1944:1), although his 'economic approach' (Clark 1953, 1954a) was not fully elaborated until later, in a series of studies which ranged widely across the spectrum of economic life from descriptions of basic diet and subsistence to land use and agricultural production, and processes of trade and exchange (Clark 1945, 1946, 1947a, 1947b, 1948, 1952, 1954b, 1965). In keeping with the general preoccupations of this period, his interpretations focused on the detailed reconstruction of economic activities from the residual traces of the material record and on imaginative synthesis and the use of anthropological insight, rather than on theoretical issues. However, he took considerable pains to emphasise economy as an aspect of culture and to stress the influence of social behaviour and 'social choice' on economic patterning. His approach might be loosely described as substantive in the social anthropologists' sense of that term (LeClair and Schneider 1968), although his comprehensiveness of interests defies easy categorisation particularly in view of the emphasis not only on social organisation, but on the relationship with the natural environment and 'the wider economy of nature' (Clark 1952:6).

Palaeoeconomy

A more 'formal' study of economic prehistory, placing greater emphasis on cross-cultural regularities and general laws or principles shaped by biological and ecological relationships, was initiated in the late 1960s under the banner of 'palaeoeconomy' by Eric Higgs (see also Davidson, this volume). Higgs' interests were strongly influenced by his former careers as a London businessman and a Shropshire hill farmer and by his early archaeological work on faunas (Higgs 1961; Higgs and White 1963), and the main outlines of palaeoeconomy as a coherent group of ideas and methods had crystallised out by 1967. This was the year that saw the shift of emphasis in Higgs' palaeolithic researches in Epirus towards off-site archaeology and the definition of territorial concepts (Higgs *et al.* 1967), and the publication of some of the work of his earliest students, notably Higham's (1966, 1967) analysis of mortality patterns in neolithic and bronze age faunal assemblages and Shawcross' (1967) reconsideration of the issues involved in quantifying diet from midden refuse. It also saw the establishment of the British Academy Major Research Project in the Early History of Agriculture, which acted as the main vehicle for the development of palaeoeconomic ideas during the next ten years, the results of which are summarised in the Project's three principal reports (Higgs 1972, 1975; Jarman *et al.* forthcoming). Palaeoeconomic research, while it represented a change of direction, was clearly related to earlier work, and indeed developed and flourished under

Clark's patronage, deriving much of its momentum from the creative tension between Clark's more humanistic and traditional outlook and Higgs' iconoclastic emphasis on animal ethology and basic economics.

The relationship of palaeoeconomy to other developments in the 'New Archaeology' of the 1960s can scarcely be touched on here, although it may be noted that, by rejecting early on the study of artifacts, palaeoeconomists placed themselves outside many of the most polemical debates of the time, and beyond even the definitions of those who see the primary concern of theoretical archaeology as the explanation of patterns of material culture. Klejn in his masterly survey noted only (without supplying the reference) that Higgs was an archaeologist who "from Australia asked 'Archaeology—Where Now?'" (Higgs 1968; Klejn 1977:12). In common with other trends of the period, however, the early development of palaeoeconomy was characterised not only by a more explicit interest in theory but by a renewed concern for methodological rigour in the retrieval and analysis of primary data. It is important to recognise this duality of palaeoeconomy, both as a particular stance about the determinants of economic behaviour and economic change, and as a general corpus of methods for improving the detail and reliability of reconstructions of economic activities, lest dissatisfaction with the former should encourage wholesale rejection of the latter.

The theoretical issues that stimulated the development of palaeoeconomy and both sharpened and narrowed its focus of interest centred around the problem of the origins of agriculture. Research was devoted to a critical analysis of the inadequacies of 'wild' and 'domesticated' as classificatory categories of food resources, and of 'hunter-gatherer' and 'herder-farmer' as categories of economic behaviour. The main thrust of investigation was over the nature and identification of domestication and agricultural development, and about the sorts of processes necessary to account for overall patterns of long-term economic change and intensification apparent in the prehistoric record. The principal challenge to an integrated approach was thus seen to lie in the attempt to resolve the apparently disparate principles of economic organisation implied by the distinct categories of hunter-gatherer/herder-farmer, according to a more general theory of economic behaviour. Research interest broadened into a general study of economies far beyond the limits of agricultural origins as traditionally conceived, in which the initial emphasis was necessarily on attempts to assess productive capacity (in terms of food) rather than patterns of distribution and exchange, and hence on the relationship between economy and environment rather than economy and society—or, in palaeoeconomic terminology, the relationship between population, resources and technology. Population pressure was emphasised as a recurrent feature of this triadic equation and therefore an important source of change in explanations of long-term patterns, and considerable emphasis was placed on long-term continuities in economic behaviour, particularly in the use of the concept of resource husbandry as an alternative to the wild/domesticated dichotomy.

Early controversies arose mainly with those who viewed the man-environment relationship through the concepts of the natural sciences, and took two forms. The first involved a fundamental break with zoological approaches to early agriculture which rested on an assumed correlation between morphological changes in plants and animals and changes in human economy. A

second divergence was from the assumption of much environmental archaeology that prehistoric environments could be objectively reconstructed by the techniques of the natural scientist without necessarily referring to the specific limiting factors relevant to the particular economic systems and archaeological sites under scrutiny. In contrast to the natural scientists' conception of the issues, the objectives of palaeoeconomy were defined as anthropological ones in which human behaviour should occupy a central position rather than a peripheral or incidental factor in ecosystem behaviour. A further distinctive feature was the rejection of certain ecological concepts. This stemmed not so much from a rejection of ecological principles, which are deeply embedded in palaeoeconomic thinking, as from a belief that specific concepts such as the ecosystem or the ecological niche cannot be used without modification to analyse developmental processes over long periods of time, or to cope with the peculiarities of the human species, in particular its flexibility in the exploitation of the natural environment and its capacity artificially to modify environmental resources for its own benefit (or detriment).

Social Relations

At a time when these earlier debates are beginning to recede and to be resolved in the light of subsequent research, the focus of controversy has shifted away from environmental and ecological relations to the role of social behaviour and cognition in prehistoric economies. This is an issue which the palaeoeconomic literature has generally excluded from consideration, partly for practical reasons, partly as a matter of belief, and in so doing has done much to stimulate the current polarity between 'economic' and 'social' archaeology, a measure of which may be seen in Clark's more recent re-emphasis on social values and social archaeology (Clark 1972, 1975, 1977:xviii). Palaeoeconomic writings have often been expressed in controversial terms, perhaps none more so than the eponymous paper of 1975 (Higgs and Jarman 1975), whose succinctness and quite deliberate provocation were well calculated to inflame lurking accusations of environmental determinism, ecological functionalism, biological reductionism, or vulgar materialism.

Two examples will briefly indicate something of the nature of this sociological reaction. Bender (1978, see also this volume) emphasised the social matrix of economic behaviour, and suggested that evolving social institutions such as reciprocal exchange mechanisms, hierarchical social structures and trade networks are the principal stimuli to long-term economic development, providing the essential motivation for the production of surplus and increased demands on the resource base. One difficulty here is that the social relations described by Bender are widely in evidence in the ethnography of surviving hunters and gatherers, and in the archaeological record of at least the last 30,000 years. We are thus brought no closer to an explanation of why the development of prehistoric agriculture, at least in Bender's conception of it, should be so highly localised in time and space. Indeed it is not at all clear what changes in the prehistoric subsistence record the alleged development in social relations is intended to explain. Ingold (1979, 1980, see also this volume) elaborated a different approach by emphasising the reciprocal interplay between social and ecological systems, in which the

exploitation of the environment is organised in accordance with premises which are socially given. The social system is seen as dominant, in that it specifies the way in which the environment is to be exploited, whereas the ecological relations are determinant only in the negative sense of setting the limits of viability. In seeking to explain the particular social transformations involved in the development of animal pastoralism and plant cultivation, however, Ingold invoked episodes of resource crisis brought about by environmental change or population pressure, an appeal to variables operating on a time-scale well beyond the range of focus of his analysis. This raises the possibility that the social reationality which is 'given' as an independent variable over the short time span of his analysis might turn out to be a more strongly dependent variable over longer time spans.

It seems that there may be a number of different types of 'social' explanation, some of which do not differ from those that would be advanced by palaeoeconomists themselves. Perhaps this is no more than to underline the artificiality of the polarity between social and economic factors. Both Bender and Ingold draw attention to the apparent contradiction between the Higgs-Jarman emphasis on continuity and the evidence of discontinuities in economic behaviour. However, this contradiction can be reconciled in other ways without necessarily having to resort to elaborate discussions of differential social behaviour (Bailey in press). If the aim of these sociological excursions is to demonstrate that certain sorts of social formations are necessary to facilitate certain patterns of economic production, or to emphasise social flexibility as a general property inherent in human behaviour which allows the possibility of economic transformations unique at the species level, then these are scarcely matters of great contention. If, however, the aim is to demonstrate that changing social relations are an independent variable of sufficient force to deter or initiate long-term economic changes, this remains a hypothesis in need of testing against the prehistoric record.

Part of the difficulty seems to lie in the very definition of the term economy. For social anthropologists, whatever their particular theoretical persuasion, economy is generally defined in terms of relations between persons, whether these be social relations of production or of distribution, rather than in terms of relations between persons and things (e.g. environmental resources). From this point of view it is no doubt logical to redefine palaeoeconomic interests as being concerned with ecology or to write them off as descriptive studies of subsistence. While appropriation of the terminology in this way may be justified in relation to problems which loom large in the study of contemporary behaviour, its importation into archaeological thinking should immediately call into question the definition of basic terms. Subsistence refers to those resources, principally food supply but including other materials, that are necessary to support life (Dennell 1979). Economy refers to the way in which the consumer population organises, integrates and manages those resources for its own benefit. It may be granted that this is simply an alternative definition of economy (albeit one sanctioned by the Oxford English Dictionary), and a definition, moreover, which subsumes and certainly does not exclude the social relations involved. From this alternative point of view, however, the issue is not whether palaeoeconomic studies are in fact about the integration and management of subsistence

resources, but whether their treatment of social behaviour as being implicit in the relations under study rather than an explicit objective of analysis is crucially detrimental to the explanations offered of prehistoric change.

The confusion between subsistence and economy is perhaps understandable in view of one practical and unavoidable difficulty in prehistoric archaeology, namely the necessity of having to approach the analysis of economy, however defined, largely through the analysis of environmental and subsistence data in the first instance, rather than through the analysis of prehistoric social relations. The latter can be inferred, at best, only in an indirect fashion from material remains, and it would be fair to argue that their study has scarcely moved beyond the level of 'conjectural sociology' (Clark 1954a:28).

Much of the reaction to palaeoeconomy, with its emphasis on animal behaviour and ecology, has been supported by recourse to anthropological thinking on contemporary or near-contemporary societies. The benefits of thorough acquaintance with this literature are indubitable, but the danger here is that recent trends in economic prehistory will be forced into a priori categories of anthropological thought, and that the literature of economic prehistory may become burdened with a re-run of controversies which properly belong to the context of anthropological debate about contemporary societies—such as the opposition between formalism and substantivism, functionalism and structuralism, cultural ecology and structural-Marxism, or sociobiology and social action theory. Indeed, many such debates have already been superseded.

Nevertheless, as will be apparent from other studies in this volume, the major challenge to an integrated approach is currently seen by many as residing in the re-instatement of social behaviour, a redefinition of an archaeology "..... whose prime concern..... is the study of how men have lived in society, of how within the social framework they have striven to satisfy and multiply their wants" (Clark 1942:208). The challenge merits a response not simply because of its importance in the development of economic archaeology, but because it has wider implications for an integrated view of human behaviour.

Time Perspectivism in Archaeology²

As a discipline which expends a large part of its resources on dating and chronology, archaeology has made remarkably little contribution to the elaboration of time concepts, perhaps all the more surprising in a discipline concerned with time spans far beyond what is customary in the studies of the anthropologist or the historian. Although frequent emphasis has been placed on the importance of archaeology's extended time dimension, the value of this is usually perceived in terms of providing a framework for the study of change, and relatively little discussion has been devoted to the possible effects that varying time-scales may have on our basic concepts. Fletcher, in a comprehensive analysis of the human perception and use of space in archaeological and ethnographic contexts, concluded that individual and social variation which has a significant impact within and between settlements ceases to be relevant at the larger scale of adaptations to the macro-environment or in the study of long-term economic patterns, and that "the

nature of social cause and effect operates differently at different scales of space and time" (Fletcher 1977a:53, 1977b). A similar point has been made by Holly (1978), who questioned whether behaviour at different spatio-temporal scales could be logically linked, and suggested that "Time must be considered a multidimensional entity, which can be defined in terms of a hierarchy of scale levels Too often the languages we employ are either incapable of distinguishing one level from another, or we use more than one language at a time, thus mixing up scales" (Holly 1978:14).

There are in fact two contrasting assumptions about the effects of time-scale involved in archaeological interpretation. One, which is more or less implicit in all archaeological practice, I shall characterise as behavioural uniformitarianism. By this I mean the belief that patterns of behaviour revealed in the prehistoric record can be explained in terms of processes visible at the present day—in effect that long-term patterns are simply the summation of short-term events. Such a belief is implicit in the archaeological application of theories and concepts derived from the study of contemporary behaviour, whether of functionalist, structuralist or Marxist orientation. The second sort of assumption—time perspectivism—is based on the belief that differing time-scales bring into focus different features of behaviour, requiring different sorts of explanatory principles. Processes and relationships visible at one time-scale, say over a period of years or decades, are not necessarily visible at time-scales measured in hundreds or thousands of years. Hence categories, concepts and explanations appropriate to the study of contemporary behaviour—necessarily a study of short time-scales—may not be appropriate or sufficient at the longer time-scales through which much of the prehistoric record is filtered. The converse, of course, also applies, that concepts applicable to long time-scales may not be suitable or adequate for the study of contemporary behaviour.

At first sight, it is true, these two approaches appear to be mutually exclusive. But this need not be so. Behavioural uniformitarianism, unless it is expressed in a particularly narrow form, does not specify that past patterns are to be explained only in terms of presently visible processes, while time perspectivism does not stipulate that contemporary processes are wholly or necessarily inappropriate. Some element of behavioural uniformitarianism is inescapable in archaeological interpretation, and without some such assumption a systematic knowledge of the past is scarcely conceivable. This especially applies at the level of Binford's (1977) middle-range theory—the level of interpretation which attempts to reconstruct behaviour patterns from the material record by a study of the natural and cultural processes that affect the deposition and preservation of artifacts. It is rather at the level of general theory—the interpretation of the reconstructed behaviour patterns in terms of general principles of behaviour, thought or action—that the distinction between uniformitarian and time-perspective assumptions becomes critical.

Whatever the degree of mutual complementarity between these two approaches, what most sets them apart are their respective conceptions of time. For behavioural uniformitarianism the passage of time can, in effect, be ignored, or at least regarded as a constant in the sense that the study of

short-term processes is treated as being sufficient to provide explanations for long-term trends. For time perspectivism, time duration is a key variable in the interpretation of past behaviour patterns; the interpretation of macro-temporal trends in terms of micro-temporal processes is seen as an assumption, and one which can scarcely be submitted to any sort of test until analysis is extended to include a span of time which can only be supplied by archaeological study. If archaeological data are interpreted only in terms of presently visible processes, that assumption remains untestable, unrecognised even, and archaeological study is condemned to apply concepts and theories derived from elsewhere rather than to formulate its own, and is thus reduced to an appendix—at best entertaining, at worst dispensable—of ecology, sociology or whichever study of contemporary behaviour happens to be the current fashion.

There is, however, a detectable reluctance among prehistoric archaeologists to face up to this paradox. An underlying reason for this seems to be an unwillingness to abandon the basic tenets of behavioural uniformitarianism. This stems, in part, from a dependence on ideas and theories drawn from studies of contemporary behaviour in which consideration of time-scaling plays no part, and in economic prehistory in particular from the limiting effect of an interdisciplinary approach on the formulation of theory. This attitude is also influenced by reaction to evolutionary theories of social and cultural development, a reaction sometimes expressed as a preference for an historical archaeology emphasising idiographic objectives. These two approaches in their turn are reinforced by a limited conception of uniformitarianism based on analogies with outdated concepts in the historical branches of the natural sciences: geology, palaeontology and cosmology. A further inhibition may be the difficulty we experience as time-bounded observers in visualising what behaviour patterns might look like from different points of view in time.

Uniformitarianism and Interdisciplinary Studies

In economic prehistory, lack of clarity about time-scales is strongly influenced by the inter-disciplinary nature of many of the central issues. A problem such as the origins of agriculture, for example, lies at the intersection of the boundaries of at least three well-established disciplines outside archaeology itself, namely biology, particularly the zoological and botanical study of the food resources themselves, ecology, with its emphasis on transfers of materials, energy and information between the constituent populations of biotic communities, and social anthropology, with its focus on the structural forms and ideological premises of particular human societies. The developing science of human ethology, with its interest in the evolutionary development of behaviour through processes of natural selection should perhaps be recognised as a fourth potential claimant on this area of study (Blurton Jones 1976).

In this intellectual no-man's-land archaeologists sit as uneasy and sometimes bewildered arbiters between the rival claims of competing and powerfully-voiced conceptual schemes. Short of abandoning their interest in this sort of problem altogether, or of succumbing to the role of mere technicians supplying data for others to interpret, they can seek to resolve

the dilemmas posed by these conflicting claims in one of several ways. One attitude is to emphasise the perspective of a single discipline—biology, ecology, social anthropology, or ethology, according to preference and intellectual background. The shifting currents of controversy in the development of economic prehistory outlined above clearly reflect the varying influence of one or other of these disciplines. A second attitude is to seek some sort of inter-disciplinary compromise aimed at a hybridisation of terms and concepts. Much of the appeal of systems theory lies in the prospect of integrating different sectors of behaviour as interacting subsystems of a larger whole, although recent criticisms indicate that such a prospect may well be illusory (Salmon 1978).

A third attitude—one characteristic of the palaeoeconomic approach—represents an alternative attempt at integration and involves making the problem of agricultural origins the central focus of a distinctive archaeological field of study, developing its own concepts in relation to the particular needs and problems of those data most relevant to the problem. Amongst the various features which are held to justify this definition of an archaeological perspective, perhaps the most important is the claim that prehistoric archaeology is confronted above all with problems of origins and development over time and with the evidence of long-term processes. From this point of view the limitations of the other disciplines which bear on the problem is that they are essentially ahistorical disciplines founded on observations of recent or present-day events and short-term processes. They are constrained by their very terms of reference and the nature of their data to exclude any consideration of long-term processes except by an exercise in more or less tenuous extrapolation from an ethnographic or ecological present.

One impediment to the development of a distinctively archaeological approach of this sort is the very number, diversity and constantly changing nature of ideas and concepts available in contingent disciplines, and the belief that the possibilities that can be derived from studies of contemporary behaviour should be fully explored before alternative solutions are sought to the problems posed by the prehistoric record. This in its turn is symptomatic of deeply ingrained uniformitarian assumptions that knowledge should be acquired by proceeding from the known to the unknown, and hence from the better known present to the less well known past—that events in the past should be explained by reference to presently observable processes. The relative view implied by the palaeoeconomic approach, that different sorts of processes operated in the past from those visible at the present day, appears to require the rejection of uniformitarian assumptions.

Uniformitarianism and 'Historical' Archaeology

An alternative approach to archaeological explanation, which appears to avoid excessive dependence on the study of contemporary behaviour and the reduction of archaeological study to a pale and ineffective imitation of anthropology or ecology, is the espousal of an historical approach as advocated by Trigger (1970, 1973). He quoted the work of historians in support of his argument that the proper role for archaeology is an idiographic, or particularising, discipline concerned with the explanation of particular events, rather than a nomothetic or generalising discipline concerned with the estab-

lishment of general laws. The latter objective he considered was best left to students of contemporary behaviour such as sociologists. He emphasised the inadequacies of evolutionism with its over-deterministic or over-simplified theories of historical development, and further supported his case by an appeal to the principle of uniformitarianism. However, his approach, like the over-enthusiastic urgings of the 'archaeology as anthropology' (ecology etc.) school, also seems to condemn archaeology to the role of a second class discipline, compelled to consume the generalisations of others, but never able to produce its own. Several critics pointed out the dangers of over-exaggerating the contrast between idiographic and nomothetic goals, but without being able to offer a serious alternative to the uniformitarian premise of Trigger's argument (Harriss 1971; Tuggle et al. 1971; Watson 1973; Watson et al. 1971).

Disciplines other than archaeology have debated over whether their goals can or should be nomothetic rather than idiographic, including history, sociology, geology and geography (Harvey 1969). The example of history is especially instructive. For, although Trigger quoted the practice of historians in support of his argument, it appears that the contrast between nomothetic and idiographic approaches, and the identification of historical explanation with the latter, owes more to the work of Sir Karl Popper (1945, 1957) than to a generally accepted consensus among historians. As Carr (1961:85) pointed out, Popper's attack on so-called historical laws represented a reaction against the supposedly deterministic philosophies of Hegel and Marx. Evans-Pritchard (1961) also rejected the contrast between generalising and particularising sciences as a false distinction devised by functionalist anthropologists to justify their disregard of history. Here, too, the reaction was inspired by the evolutionist inheritance of the nineteenth century, but not so much because it was deterministic but because it produced conjectural history. The French sociological historians of the Annales school such as Febvre, Bloch and Braudel exemplify the search for historical generalisations. One might also cite the various attempts of their successors to integrate the surface interplay of 'events' with the persistent underlying patterns, or 'structures', of the long term, although there is clearly room for wide-ranging differences of approach within this broad position (compare, for example, Chesneaux 1978:97-104 and Le Roy Ladurie 1979:111-131, or Foucault 1972). It is true that historians have been rather wary of labelling their generalisations as 'laws' (Atkinson 1978), and that the attempt to formulate explicit laws has been as vulnerable to the attentions of Mickey Mouse as in archaeology (Flannery 1973). However, this has not deterred them from making comparisons and contrasts in the search for patterns, regularities and causes, even if the balance of emphasis has tended towards greater understanding of the particular, rather than a precise definition of the generalities under which the particulars are subsumed.

Perhaps the most important comment in the archaeological debate initiated by Trigger was his own statement made in defence of his views (in Tuggle et al. 1971:134). While reiterating his belief that the general laws of culture process were best studied in the present, he noted in passing that 'If one assumes that there are certain processes that can be studied only over long periods of time, then a special role for archaeological data may be justified'.

At this point it may be helpful to consider how the concept of uniformitarianism has fared in the discipline that first gave birth to it in the early nineteenth century. Lyell's assertion that spectacular, large-scale episodes in earth history could, given a sufficient length of time, be accounted for in terms of small-scale processes going on at the present day was essential to the removal of divine intervention from geological explanation and the development of a scientific approach. This idea was taken over by Darwin in his theory of organic evolution. However, the uniformitarian basis of Lyell's geology is really a dual conception (Gould 1965). 'Methodological' uniformitarianism, a belief in invariant laws of nature, has remained a central principle of scientific method. 'Substantive' uniformitarianism, a belief in uniform rates of change, has not stood the test of subsequent work. Not only is it clear that rates of change vary, but that different sorts of processes tend to operate at different rates, requiring different time-scales for their effective observation (Vita-Finzi 1973). Mountain building, for example, is only visible and amenable to analysis on a time-scale of tens of millions of years. For other geological processes, such as cycles of sedimentation and erosion, a time-scale of tens of thousands of years may be more appropriate. This is not to say that these processes are not going on at the present day, or that an on-the-spot observer might not detect their operation if he possessed sufficiently sensitive instruments, only that no effective analysis or interpretation would be possible of the very slight changes visible over such a short time span.

A second modification of the uniformitarian principle is that different principles of causality may apply at different time-scales, so that what appears to be a cause at one time-scale may turn out to be an effect at another time-scale. For example, over a short time span, the morphology of a river channel may appear to be a relatively fixed and independent feature, which determines the hydraulic properties of the river water. Over a longer time span the nature of the river flow will affect channel morphology. What appears relatively constant at one time-scale becomes highly variable at another, an independent or a dependent variable according to the spatial and temporal frame of reference (Schumm and Lichty 1965).

In theories of biological evolution, on the other hand, substantive uniformitarianism seems to have remained relatively intact. Slobodkin (1976), for example, has asserted that there are no trends in the evolutionary process, apart from a conservative tendency to do nothing, or to respond to disturbance in the smallest possible steps, and it is a widely held feature of the neo-Darwinian synthesis that such trends as are apparent in the long-term record are no more than an incidental outcome of the small-scale processes of natural selection (Schopf 1977, see also Foley, this volume). However, Gould (1977) has recently raised the serious possibility that the patterns of macro-evolution observable in the palaeontological record depend on processes not visible in ecological time.

Some of the clearest examples of time perspectivism are to be found in cosmological studies and the seemingly bizarre concepts of space-time (Davies 1977). For example, Einstein's theories deal with the vast distances

of galactic and inter-galactic space, distances over which the finite speed of light becomes a variable of the greatest significance. On the more modest scale of our own solar system the effect of this variable is so small that it can be ignored for most purposes. The older mechanical view of Newton explains most of the features of the system, barring minor anomalies such as the irregularity in Mercury's orbit, and is quite sufficient to place men on the moon. On yet a smaller scale again, pre-Copernican conceptions persist. The assumption of a flat earth is perfectly adequate at scales where the curvature of the earth's surface is so small as to be irrelevant, for example in non-geodetic distance reckoning, Euclidean geometry and civil engineering. The development of ideas about the universe has involved not so much a replacement of one theory by a more advanced one, but rather the unification of an existing view within a larger whole which specifies the limits of scale within which the older assumptions work and beyond which they cease to be effective.

There is, then, in these historical disciplines no inherent conflict between time perspectivism and methodological uniformitarianism. The growth of a unified body of knowledge does not consist of establishing a single set of principles, which is then held to be absolutely and universally valid, but rather depends on establishing the existence of different sets of principles, each valid relative to its particular scale of focus. There is no absolute temporal frame of reference, only a relative frame of reference. While the concepts that work within these different frames of reference should be mutually compatible (if methodological uniformitarianism is to have any meaning), they cannot be transferred without modification from one frame to another.

Time Perspectivism in Human Behaviour

Developments in the natural sciences offer no guarantee of the correct approach in archaeology, and it may be asked what relevance these rather remote geological and cosmological perspectives have to human affairs. Let us then bring the argument down to earth again to consider what variables in economic behaviour might operate differently at different time-scales. Two brief examples may help to illustrate the possibilities. The first refers to the much discussed concept of population pressure as an explanation of prehistoric economic trends. This can be applied in at least two different ways. According to one school of thought, which takes its inspiration from Boserup's studies of modern and recent agricultural practice, population pressure can be treated as an independent variable (Spooner 1972). Periods of economic stagnation or decline can be attributed to stable or declining population levels, periods of economic growth to population increase which pushes against the existing resource ceiling, depending on the inherent balance between levels of natality and mortality. An alternative view is that on the larger time-scales of prehistory, these small-scale fluctuations become smoothed out, and population pressure becomes, in effect, a constant, so that explanations of economic change visible at this time-scale must be sought in other factors (Bailey in press; Bronson 1977; Cohen 1977; Higgs and Jarman 1975). What appears to be a variable on a small time-scale becomes a constant on a large time-scale.

The second example illustrates the reverse principle. Extreme climatic and environmental fluctuations tend only to occur and to have an impact on human behaviour patterns over fairly long time spans. Strictly speaking, we should recognise a number of different periodicities ranging from the extreme amplitude of glacial-interglacial fluctuations operating over tens of thousands of years, to the lesser fluctuations of centuries, to the minor changes from day to day and year to year (see O'Shea and Halstead, this volume). For the ethnographic observer working at the short end of the time-scale, environmental factors can be and are treated for many purposes as constants. Over longer time spans these may be variables of considerable significance in their potential effects on economic behaviour, although they are often ignored because of the lack of independent palaeoenvironmental data, or the fear of being tainted with the extreme oversimplifications of environmental determinism (Le Roy Ladurie 1972; Vita-Finzi 1978). Similarly the assessment of genetic influence on the development of cultural adaptations requires long time spans for its effective investigation (Durham 1976).

The use of the term 'adaptation' exposes some of the difficulties of ignoring time-scaling factors. Much of the conflict between cultural-ecological and structural-Marxist approaches to human behaviour centres on the use of this term. Both parties in the dispute seem to assume that adaptive behaviour is behaviour that exists. Structural-Marxists can point out that if all behaviour that exists (including social structures and beliefs) is adaptive, this is either self-evident or absurd (Godelier 1972; Sahlins 1974). Cultural ecologists can reply that not all behaviour that exists need be adaptive, but thereby undermine much of the explanatory power of their approach. There is, however, an implicit assumption here, that behaviour that exists within the time span of anthropological observation is behaviour that has persisted for some indeterminate time previously. This assumption may be acceptable in biological and ethological studies, where the viability of genetically-based behaviour is determined by the reproductive process. Traits that are maladaptive in relation to existing conditions are swiftly eliminated and cannot be recalled should conditions subsequently change. Cultural transmission, however, represents an accumulation of behaviour patterns, ideas and techniques which persist to some extent independently of their originators. Maladaptive or non-adaptive patterns may persist, in store as it were, alongside the adaptive, ready for more widespread adoption if conditions change. The greater flexibility and speed of response that this confers also entails a greater looseness of fit between behaviour and environment, in which factors on either side of the relationship may be varying at different rates and thus appear to be out of phase over short time spans.

Another factor that should reinforce the exploration of time perspectivism in prehistoric investigations is the very nature of much of the available data. A sample of archaeological sites, animal bones, molluscs, or of any other type of subsistence data, large enough for reliable interpretation, often represents a palimpsest of activities ranging over a period of at least a hundred years to several thousand or more. It refers not to the activities of individuals, or even individual societies, but to larger aggregates of behaviour, reflecting average tendencies which persisted over long periods

of time. This coarseness of resolution is further accentuated by the margins of error inherent in radiometric dating. This is not to say that a finer resolution of short-term variations may not be possible in favourable circumstances, for example in the dendrochronological study of neolithic lake settlement (Sakellariadis 1979), or that some features of the material record cannot be usefully referred to individual actions, as in the culture-symbolical study of stylistic variation in artifacts (Hodder 1979). But much of the palaeo-economic record refers, by definition, to long-term trends. While this may seem a severe limitation, it also offers an opportunity to focus on a different scale of behaviour and imposes a requirement to adjust one's conceptual framework accordingly.

Time Boundedness

A final deterrent to exploring the implications of time perspectivism lies in the tendency to view historical processes from a single, fixed observer position in time, that of the present. From this time-bounded perspective, events and processes near to us in time appear more detailed and complex than those further back in time, and it is natural to see in this the evidence of a directional historical process. The concept of directional or sequential time is strongly rooted in the Western scientific tradition, and contrasts with the conception dominant in Greek or Mediaeval thought of time as cyclical or eternal (Tuan 1978), differing conceptions which reflect two fundamentally distinct notions of time: repetitive or reversible time, and directional or irreversible time (Leach 1966:124-136).

Some of the most far-reaching questions raised in historical studies centre on whether the time trends under study are directional, implying a beginning and an end, or part of an endlessly repeating series of oscillations. In cosmogony the contrast is between big-bang and steady-state or oscillating models of the universe, in palaeontology between directional and steady-state theories of organic evolution, and in human history between the conception of progress and the rise and fall of civilisations.

Archaeological theories of prehistoric development, in contrast, are almost entirely directional. If the nineteenth century notions of progress and unilinearity have long since been abandoned, current theories of social evolution addressed to such problems as the origins of agriculture and urbanisation rely more or less implicitly on the idea of multilinear directionality. A fully articulated steady-state theory of social evolution scarcely exists, although a significant element of such thinking enters into the Higgs-Jarman palaeoeconomic theory of agricultural development. As against almost all other theories, which regard the origins of agriculture as a progressive development in the terminal Pleistocene and Early Holocene, they see the technical and cognitive skills of resource husbandry implied by the conception of agriculture as being universally inherent in human exploitation of the environment, although subject to variations according to local circumstances; directionality, according to their view, is confined to long-term overall increases in the gross level of economic output.

The choice between emphasising directional and steady-state aspects of development is partly dependent on the point of view adopted, and is

further complicated by the effects of varying the time perspective. A directional trend at one time-scale may turn out to be part of a steady-state oscillation at a larger time-scale. This in its turn may appear as part of an overriding directional trend at a yet larger time-scale again.

It is an inevitable part of our status as individual observers and our time-bounded condition that we tend to understand most easily what happens close to us, whether that closeness is in terms of personal experience, space or time, and that the extension of our understanding involves projecting outwards the familiar categories of our own experience until confrontation with more remote or less familiar data requires their modification. The dominance of this egocentric or ethnocentric view is easily corrected in terms of personal or social experience because we can observe and question other people and appreciate their 'point of view'. The application of this corrective is almost a truism of anthropological research, and finds its expression in economic anthropology in the rejection of the formal models of Western capitalist economies as appropriate analogues for all economic systems (Godelier 1972). In spatial terms also we can change our position at will and appreciate the different perspective offered by different observer positions in space. We know that the earth's surface is not really flat because we can take photographs from an orbiting satellite; we know that the convergence of parallel railway lines at a point on the horizon is an optical illusion because we can travel along the railway track. Our time-bounded perspective is less easily corrected because we cannot easily travel through time. At best we can only move backwards in time, and then only through the vicarious and highly imperfect methods of historical and archaeological research.

Conclusion

I have emphasised time perspectivism here, not because I believe it is necessarily the only approach to archaeological explanation, but in order to highlight a set of assumptions that has always been implicit in palaeoeconomic thinking. Moreover, time perspectivism has three general virtues which are worth emphasising. First, it reasserts the importance of the historical dimension in archaeological data, without committing us to the fate of an idiographic discipline. Secondly, it allows for the co-existence of a diversity of theoretical points of view without undermining the search for integration. Thirdly, it challenges us to justify our theories in archaeological terms regardless of the support they may derive from adjacent disciplines.

Equally, a number of objections may be raised against the time perspective view of human behaviour that I have sketched out above. One obvious point is that its implications are far more complex than I have indicated. Time perspectivism is not simply a question of distinguishing the short term from the long term, the present from the past, existence from persistence. There is a multiplicity of scales, and more detailed consideration is required to define the limits of these different scales, the way in which they mesh together, and the residual effects at one scale of processes which are more clearly in focus at another scale. Even activities played out in the ethnographic present are influenced by longer term decisions (Holly 1978), while the long term record of prehistory comprises a number of different scales ranging from the one hundred thousand year time-scales of the Lower Pleistocene to one hundred year time-scales in the later periods of prehistory.

A more fundamental objection may be that since behaviour patterns are mediated through the actions of individuals as members of corporate societies, explanations that leave these factors out of account in an appeal to a different order of scale are somehow incomplete explanations. If we leave aside the notion of completeness as being—like the notion of absolute truth—beyond the scope of the present discussion, the nub of this objection seems to be a reluctance to abandon an egocentric view of the world which requires that even the remotest features of reality be reduced to, and explained in terms of, the familiar categories of everyday experience. Time perspectivism is no more than an extension along a particular dimension of the quite unremarkable principle that group behaviour is more than a simple sum of the individual actions and behaviour patterns of which it is constituted, and cannot be inferred from or reduced to a study of its individual members.

Another sort of objection may be that time perspectivism is simply an elaborate justification for the perpetuation of palaeoeconomic dogma. If the counter to this sounds like an appeal to realism, nevertheless it may not be inappropriate to reassert the practical value of accepting the limitations of time-scale and concentrating on those variables that are most sharply in focus in the prehistoric record, rather than striving in vain for an elusive type of data. The crucial question is not what features of human thought and behaviour are relevant to explanations in economic prehistory, but what time-scale is best suited to the study of the particular variables which interest the analyst, and where in the total span of human behaviour the necessary chronological resolution and the necessary data are most easily to be found. If the interest is in the relationship between economic exploitation and social and ideological values, then short time-scales in the present or recent past would seem to offer the most suitable frame of reference. For effective studies of the ecological relationship between economy and environment, longer time spans would seem to be necessary. It is no coincidence that classic palaeoeconomic theories tend to be most popular with those who work mainly with the archaeology of the Late Pleistocene and Early Holocene; sociological theories with specialists whose interests centre on the Late Neolithic and Bronze Age or later (in European terms); and more strictly ecological and genetic theories with specialists in the earlier phases of the Palaeolithic.

If the proposition is to be taken seriously, that socially given premises — or culturally determined perceptions of environment are independent variables on the longer time-scales of prehistory, capable of exerting a significant differential impact on long term economic trends, then their effect must surely be manifest in the material record of prehistoric subsistence, and the inadequacy of current palaeoeconomic explanations made apparent. Archaeological data may be patchy, ambiguous and difficult to analyse, but only the most abject pessimist would deny that the prehistoric record can be made to speak on this issue if interrogated with suitably framed hypotheses. If, however, the main message of the sociological polemic is that social behaviour and social action represent autonomous fields of study, that they cannot be reduced to or inferred from economic or ecological data, that they develop, at least in part, according to a logic of their own, or that different social solutions may be found to similar economic problems, these points may all be valid and even interesting, but their relevance to the central

concerns of economic prehistory has yet to be demonstrated. It would be mistaken to exclude any hypothesis or concept a priori, except as a matter of personal preference or as an act of faith. But if it be granted that the polemical confrontation within archaeology of different assumptions about human behaviour has stimulated the perception of new problems in recent years, it should also be recognised that the resolution of these problems cannot be achieved without recourse to the prehistoric record.

Footnotes

1. The term 'economic prehistory' is used here in preference to economic archaeology, partly as a matter of convention as the term most commonly used in the literature cited, partly to express the emphasis on the earlier periods of the archaeological record.
2. The term 'perspectivism' is preferred here, following Walsh (1951) and von Bertalanffy (1968), rather than 'relativism'. The latter term is widely used in anthropology, e.g. cultural relativism (Harris 1968), but may refer to the study of relations rather than the relativity of knowledge.

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