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Palaeoeconomy

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Recent advances in its technical armoury, particularly the advent of the computer, have given to archaeology the appearance of a rapidly if unevenly developing subject. Many archaeologists have felt constrained to review and adapt the methods they employ in data retrieval, analysis, and exposition in the light of these developments. Of more moment, however, has been the increasing attention given to archaeological theory and the concern with the formulation of specific conceptual models. Many of the new methods and approaches put forward, however, have been borrowed directly and unaltered from other disciplines for which they were designed, and there has been little coherent attempt to formulate models with specifically archaeological objectives and data in mind. Whatever the various merits of these approaches may be they are an expression of a dissatisfaction with current archaeological theory and objectives and of a belief that more may be achieved by an extension of archaeological theory than by the elaboration of analytical methods.

In the nineteenth century a primary concern of archaeology was the need to establish a chronology. This interest has been largely taken over by scientific methods, and many of the traditional archaeological procedures have thus become redundant.

Another primary concern was the need to explain the artefacts recovered in excavations. The explanation was at first usually expressed within a geological framework, and an evolutionary stadial model was employed. The focus of attention shifted under the influence of late nineteenth-century nationalism (see Childe, 1956), particularly in Germany, and the 'culture-people hypothesis' became the main paradigm in the light of which archaeological data were considered. This hypothesis, most explicitly developed by Childe, proposed that archaeological 'cultures', defined in terms of artefactual groupings, be considered as representing prehistoric peoples. As Childe put it, the purpose was to rig up a culture with the trappings of personality, and the literature is in consequence full of 'the Magdalenians', 'the Natufians', and 'the Beaker Folk'.

A third factor was the Marxist influence which developed with the conflict between rival social and political systems. Childe accepted Durkheim's view that 'We can choose the form of our houses no more than the cut of our clothes; the

one is imposed on us to the same degree as the other by social usage.' However, in selecting the social system as his deterministic priority he consigned other and more powerful directives, which he called 'instinctive' behaviour, to another discipline, thus depriving archaeology of a crucial key to the study of the mechanisms of prehistoric development.

Furthermore, the nineteenth century had always to take the supernatural into account in its considerations of man, endowed as he was with the gift of free will.

There seems no reason now why we should continue to be guided exclusively by nineteenth-century traditions and priorities, born as they were of the then contemporary needs, social conflicts, and climate of thought. We can surely pursue different priorities more in line with current needs, and one may wonder if this is best achieved by the elaboration of traditional archaeological models or whether there is not a better case for the reconsideration of basic objectives in the light of today's situation and intellectual climate.

AN ALTERNATIVE APPROACH

There is now no reason why, like the physical and behavioural sciences, we should not exclude the supernatural from our considerations. Throughout his history man has, in Ruth Benedict's phrase, 'defended his uniqueness like a point of honour', and archaeologists have not been lacking in this respect. Whatever the merits of self-reassurance may be, there seems little justification for continuing in archaeology the search for criteria to demonstrate the critical differences between man and animals. Self-consciousness and reason, symbolism and language, can at best only be inferred by the most tenuous extrapolations from the available prehistoric data, and the soul leaves no skeleton. Not only are such criteria beyond the range of archaeological data, but it seems unnecessary and unhelpful to continue the obsession with human uniqueness. Everything above the molecular level is unique and the quality of uniqueness is the rule rather than the exception.

At the most optimistic assessment it must be said that the

human uniqueness standpoint offers only one of the possible views of human behaviour, a view which may actively obscure some of its important aspects. In highlighting human uniqueness and, in accordance with another major archaeological preoccupation, searching for the idiosyncratic and the individual within archaeological data, certain behavioural facets can never be adequately studied or evaluated. This can only be justified by the belief that these facets are less interesting, important, or worthy of study than those of traditional archaeological concern; a view which should perhaps be treated with reserve as it becomes increasingly obvious how little we understand of the motives for human actions, and how critical for the continued success of the species it may be to acquire this comprehension.

As studies in the behavioural sciences proceed it is becoming evident that crucially important aspects of human behaviour have more in common with the behaviour of other animals than we commonly allow. This view draws support from many fields, and is implicit in work in such diverse subjects as urban planning and criminal law (see Sachar, 1963; Tomlinson *et al.*, 1973). Clearly the principles of animal ethology and ecology must come into our consideration of human behaviour if we are to take this relationship into account, and there is every reason to include man in considerations of natural phenomena. If we do not know the nature and extent of biological influences or what over-riding biological principles exist, how can we hope to perceive to what extent man is subject to or independent of them, or to understand, in any wider sense than the purely descriptive or typological, archaeological 'cultural' variability?

Further, the pursuit of the social system as a primary controlling factor in human behaviour, even if it were practicable using archaeological data, is not wholly satisfactory in the climate of thought of today. The term 'social system' can be viewed as a clustering for the sake of convenience of a diversity of behavioural strands springing from a diversity of roots, each of which it may be more informative to follow individually. While many are willing, if pressed, to accept the proposition that ultimately all human culture and society is based upon and is only made possible by biological and economic viability, the tendency is to neglect the biological basis and concentrate upon the multitude of material and conceptual developments which has been erected on it.

There should be a branch of archaeology which digs more deeply and has as its primary interest basic aspects of human behaviour which underlie and form the fundamentals and directives of social systems. One may indeed suspect that the substantial convergence of different social systems in modern times must lead us to the conclusion that in the long periods of archaeological time (often of a thou-

sand or more years in duration) the relatively simple prehistoric social systems, under biological evolutionary pressures, were probably so similar in their form and consequences that their dissimilarities would have had little significance in human prehistory. Furthermore, there are indications that the social system varies only within the permissible limits set by biological requirements; if these change, radical social change may be expected to follow swiftly, as is being experienced, often uncomfortably, in many areas undergoing rapid industrialisation.

A criticism sometimes levelled at attempts to view human behaviour in the context of biological principles is that they 'miss the point' - 'the point' presumably being that of human uniqueness. We may cling if we wish to the understandable belief that 'the most important thing about man is his humanity'. Even if this is accepted, however, it does not follow that the best way of understanding man is through his peculiarities. These 'anachronistically deterministic models', as biologically oriented approaches to archaeology have been called, are an attempt to eliminate the supernatural from our considerations of man. If a science of human behaviour is to be possible a search for over-riding principles or natural laws is of prime importance; and however unfashionable the term and ideas behind determinism may be, the very existence of natural laws presupposes a degree of determinism. With this objective in mind we can begin to establish archaeology as an intellectual discipline rather than the descriptive and technical exercise it is. The unidirectional trend of many aspects of human development indicates that there are indeed predictable laws of human behaviour; it may be profitable to concentrate on these, which are significant in the long archaeological record, but which may not appear, or may be swamped by the noise of innumerable short-term trivia, in the historic or anthropological record. Even in subjects concentrating on modern situations, such as sociology and psychology, where much data are available which can never be accessible to archaeology, and where the problems of sample control are greatly mitigated, the froth of short-term variables has impeded the formulation of accepted principles for some of the most crucial areas of study. This is evident in the endless, and perhaps never-to-be-ended, confusion as to the relative importance of environment and genotype in the formation of human personality.

Despite these developments in the climate of thought much of modern archaeology is cast in a traditional mould. At present one can perceive five main approaches to archaeology, although as with most classifications the edges are blurred and aspects of one approach are frequently to be found combined with another.

Artefactual explanation

This is in many ways the most primitive of archaeological approaches, as it has no declared purpose other than the collection, description, and classification of archaeological objects. The lack of an overall objective for these studies prevents anything more than the industrious accumulation of increasing amounts of information of uncertain value.

Palaeoethnography

The concern of ethnography is the characterisation of the races of man, including their habits, possessions, and distinguishing features. It has thus always been a descriptive and classificatory discipline rather than an analytic one, concerned with the collection and ordering of data rather than with processes and causality. Much of the main stream of archaeology over the past century has betrayed the same preoccupations, and even the apparently revolutionary 'New Archaeology' consists more often than not in the employment of new techniques rather than a reorientation of objectives. The definition of 'cultures' and the tracing of 'cultural influences' by the analysis of artefact and assemblage affinities remains the primary concern of many archaeologists, even though they may employ sophisticated concepts and equipment to this end.

Today it is popular to elaborate the framework within which such analyses are pursued, and one frequently encounters introductory affirmations of belief in the importance of other aspects, including evidence concerning the nature of the environment and economy. Consideration of these 'ancillary data' is rarely integrated into the work as a whole, however, and has little impact on the central concerns of the research.

The delimitation of peoples and tribes in prehistory does not in itself seem a worthwhile objective for the core of the discipline, especially as it has been demonstrated that one human group may practise two different stylistically based 'cultural' entities however they may be defined.

The systems approach

The 'systems' approach to archaeology, employing the principles and language of cybernetics, offers apparent theoretical advances, but has yet to yield much in the way of concrete results. In fact, perceptive archaeologists have for decades accepted that human communities are but one part of greatly more complex organisations, and while the concepts may not have been expressed in terms of 'homeostasis' and 'feedback', the complex inter-relationship of different factors in the human environment has been implicit in much traditional archaeology. A severe limitation is placed on the efficacy of a systems ap-

proach by the necessity of tailoring the method so rigidly to the eccentricities of archaeological data. It is one thing to propose that human communities are best studied in terms of the forces and relationships between social, demographic, economic, ecological, technological, and moral systems; the proposition loses something of its appeal when it is realised that in archaeology one can deal ineffectively or not at all with many of these aspects of human behaviour. These deficiencies result in an archaeology necessarily traditional in its basic concerns, although often expressed in misleadingly unfamiliar language.

A further disadvantage of this approach, in so far as it has yielded results to date, is that in emphasising the complexity of natural systems it concentrates attention on the apparent disadvantages of isolating simple over-riding mechanisms. This appears justified as long as the focus of study remains short-term and parochial; but a primary advantage of archaeological evidence is its capacity for use as a long-term record thus allowing the separation of logically explicable trends from random noise. Of course it is also true to say that little or nothing observable in human behaviour is truly random; it is related in some way to other factors in the system; but it must be treated as noise if its significance cannot effectively be pursued in terms of archaeological explanation.

The undoubted existence of myriad influences on human 'systems' has led some to reject the search for simple over-riding factors. A conceptual circle or sphere is sometimes erected with innumerable interconnections but no beginning or direction. It is absurd, however, to consider that complex and multifactorial systems necessarily have no simple guiding principles, or that each definable aspect of such a system should necessarily be thought of as of equal significance.

Human palaeoecology

The last decade has seen a rise in interest concerning man's place in the ecosystem. This is related to a number of factors, in particular the growing public interest in ecology and environmental conservation. A reasonable term for the study of man's rôles in the prehistoric ecosystems of which he was a member is human palaeoecology.

Despite its many apparent attractions there is a number of grave difficulties in the pursuit of this approach to archaeology. The first of these is that the ecosystem, while a necessary philosophical concept in the light of which to consider the data of biological organisation, is inherently beyond empirical study in itself. 'The ecosystem is so all-embracing and so subtle that it seems to defy analysis' (Andrewartha & Birch, 1954). In order to study the subject

it must be broken up into manageable units; aspects of, and relationships within, ecosystems can be studied and then related to the overall concept, but methods of data retrieval and analysis cannot now or in the foreseeable future begin to deal with the complexity of whole ecosystems even if these could be satisfactorily defined. If ecosystems themselves cannot be studied at the present day, how much more unrealistic it is to attempt to reconstruct and analyse prehistoric ecosystems, the vast preponderance of the evidence for which has irretrievably vanished, and which must thus be inferred from the few remaining traces.

A second primary drawback of an ecosystem model for archaeology is that it focuses attention on subsidiary aspects of the main objective. Archaeology is, or should be, a discipline concerned first and foremost with man, and while we necessarily accept the existence and relevance to our studies of ecosystems, this need not lead us to make them the central principle around which we arrange our hypotheses and data. It is clear that many features of human (and indeed other animal) behaviour transcend and cross-cut a number of ecosystems in which the populations participate. This is not to say that these behavioural features cannot be considered within the framework of an ecosystem model; but this is not necessarily the most appropriate model available. Many important human behaviour patterns are specifically designed to extract and integrate resources from a variety of ecosystems. As far as can be judged from the prehistoric record, the local ecology is not a directly determining factor for many human groups, although individual elements within it may have a strongly determining influence. This is witnessed by the common occurrence of very similar economies and tool-kits in widely differing ecological circumstances but where certain crucial economic resources remain unchanged. It is an expression of some of these difficulties inherent in the 'ecosystem approach' that many publications which are claimed to be concerned with the fashionable palaeoecology are in fact dealing either with the traditional environmental description or with aspects of palaeoeconomy.

Palaeoeconomy

Palaeoeconomic studies may be used to clothe with economic flesh the ethnic entities assumed from stylistic clusterings, and test their validity but its objectives are not confined to the augmentation of palaeoethnographic studies; it raises different problems and asks different questions. There is no reason to confine the questions asked to those of interest to palaeoethnographers. Its concern is with population technology and resources.

Palaeoeconomy is first about man and his behaviour; or, since 'behaviour' like 'the ecosystem' is too complex

to study in itself, about those aspects of human behaviour which appear in the archaeological time perspective to have been of long-term significance. There are two major reasons for this focus of interest. In the first place, as many others have pointed out, the long time scale is a unique advantage of archaeology among the studies of man; it is therefore more profitable to exploit this quality of archaeological data in the search for long-term principles and directives than to strive to extend the historical narrative backwards in time to produce a pallid or romantic history. More important still is that archaeology, if it is to mature, must begin a search for natural laws governing human behaviour. If man is not to be considered supernatural – and, if he is so considered, a scientific study of man is impossible – then he is presumably subject to certain laws or principles, the study of which ought to be worth pursuing.

The primary human adaptation to the environment is the economy, man's management of his household. Artefactual explanation has not proved particularly informative in such matters, and thus does not have a prior place. Palaeoeconomic studies lay their main stress on a basic aspect of human behaviour which can be shown to conform to predictable laws over long time periods. Because no supernatural barrier, intellectual or otherwise, is assumed to exist between man and other organisms, animal studies are considered as relevant to our approach as anthropology or history. Indeed it is revealing to observe how similar many of the concerns, concepts, and even the language of much of animal ecology and ethology is to that of simple economics. The ethological concepts of territory and home range can usefully be applied to man. Nor should we be concerned myopically only with studies of primate behaviour. Animal (including human) behaviour is conditioned by the way the animals get their living, and in this respect primate behaviour is more removed from human behaviour than that of many other animals. In many ways the large carnivores offer more relevant comparative data than the primates. A further reason for the consideration of animal behaviour is that only thus can we hope to ascertain which behaviour patterns may be considered specifically and characteristically human. At present precisely similar patterns of behaviour tend to be considered very differently depending on whether they are undertaken by man or other animals. For example, migration and transhumance, which serve the same purpose of overcoming population limiting factors and seasonal imbalance of resources both for man and other animals, are described as 'cultural' behaviour in the first instance and as 'instinctive' behaviour in the second.

The commitment of palaeoeconomy to the search for trends of long-term significance directs its attention to the major factors which direct and determine human behaviour

and development. Daryll Forde's attempt to pursue this goal in anthropology (1934) was doomed to failure by the lack of a sufficient time perspective. While anthropology can help by providing a known range of behavioural variables, it cannot select out the few which will be of importance in the long term. Our interest is in the constraints, rather than in the noise of choice which tends in any case to operate upon the short-term trivia, on the economic fat rather than on the basic necessities.

A major determining factor in the animal world is the relationship between populations and resources, and we may assume that the same factor is of similar importance in human behaviour. This crucial relationship has had an important long-term influence upon human decisions, whether this has been as the result of conscious responses to a situation or of subconscious responses due to biological feedback mechanisms. Such processes can be seen in the reaction of human populations to situations where the resource ceiling has been lifted by technological or environmental change, and no less where a corrective is necessary to unsuccessful efforts to overcome resource limitations. The extension of exploitation to inferior or marginal land in times of population pressure, and the effect of technology on the relationship between population and resources are two processes susceptible to study by archaeological means. However, relevant over-riding hypotheses are necessary in order to be able to consider past human behaviour coherently in relation to these and other factors.

RESOURCES

The extractive capacity of an animal species does not generally change on an archaeological time scale, and the study of the human exploitation of resources with a fixed technology can best begin with ethologically oriented territorial studies. The concept of territory in archaeology and the definitions of site exploitation territories and annual territories have been published elsewhere (Higgs *et al.*, 1967; Vita-Finzi & Higgs, 1970). Man, however, can lift the resource ceiling more quickly than the other animals by

- (1) technological development which increases his extractive capacity within the available territory; and
- (2) technological development which increases the available territory by reducing the degree to which the time-distance factor is limiting.

As resources in nature are unevenly distributed, the maintenance of the maximum population possible with the total available resources encounters the resistance of the time-distance factor, which is a major limiting constraint upon populations. Many basic aspects of past, as of modern, human behaviour are geared to the overcoming of

this constraint, and an important factor in human development has been the increasing capability to integrate effectively a diversity of widespread resources. We have in our earlier publications pointed out the importance of the time-distance factor and how the overcoming of its limitations has been a continuing process from dispersed hunter-gathering communities to urban agglomerations.

The data available to archaeology have in the past largely consisted of on-site data, both artefactual and biological. There has hitherto been little attempt to relate the two types of information, as they have usually been studied by different disciplines with different concepts and interests. In palaeoeconomy it is the relationship between them which is the principal interest, and it is vital for all the disciplines concerned that the importance of this relationship is recognised, for only thus can archaeological data be used to achieve its primary purpose: the creation of a scientific study of man. Furthermore, it has emerged that off-site data must be considered as of equal importance to on-site data. The consideration of the relationship between these two categories of information is of the first importance, but has so far been confined to broad environmental studies relevant perhaps to climatology and vegetation history, but contributing little more than some background scene-setting to the study of human behaviour. This has been of minimal value, and it is clear that the perceptible differences of climate and vegetation commonly have had little effect upon human behaviour. A further result of much of this work has been the great emphasis placed on the detection and analysis of change, often trivial in human terms, rather than continuity. This preoccupation can now be seen as misleading, at least in so far as it is indulged to the exclusion of concern with long-term constants. Territorial studies enable the relationship of on-site data to off-site data to be studied more precisely, in greater detail, and illuminate aspects of the relationship which are not perceptible by any other technique in current usage. In addition, as can be seen from some of the following papers, these studies tend to provide a necessary corrective to the view that human prehistory has been overwhelmingly dominated by change.

POPULATION

Chronological units such as those implied by the term Neolithic are thousands of years in duration, and isotopic dating commonly only gives an estimate of age to within several centuries. Few archaeological events, therefore, can be regarded as precisely contemporaneous but only as 'archaeologically contemporaneous', that is within a considerable range of time. There is little point, therefore, in erecting unworkable demographic models based on historical or ethnological data, whose primary concern is

with phenomena of less than a few centuries in duration. While recognising the existence of short-term phenomena, a useful model for archaeological purposes will of necessity avoid the need for their consideration. Short-term models are in any case commonly based on data which are not available to archaeology and there is little point in putting forward untestable hypotheses and explanations. A basic demographic model for archaeological purposes must be concerned with long-term phenomena and trends of more than a few centuries duration, and must be based on archaeologically available data. Relevant subsidiary models can be created to deal with particular short-term situations, if the data are available, but these should not be allowed to swamp or distract us from the basic over-riding trend.

As in the rest of the animal world, human populations have the potential for a geometric rate of increase. As Sauvy (1969) puts it 'even the least prolific of uniparous animals can easily double their numbers in twenty years and through geometrical progressions this leads in a relatively short time to very high figures ... A primitive human population ... is more or less in the same position as an animal species: it multiplies until it reaches the maximum level allowed by its surroundings and the use it can make of these surroundings'. With developing technology the long-term trend is for the population level to rise, and despite the short-term oscillations of centuries the long-term curve continues upwards. With the data available to archaeology and its coarse chronology this is a trend we should be able to perceive and analyse in prehistory. Man through his technology has repeatedly succeeded in raising the restricting ceiling of the resources available to him - overcoming the 'resistance of the environment' in Sauvy's terms. The upward curve of human populations and their utilisation of resources will therefore not be smooth but will proceed in a series of steps, of upward jumps separated by plateaux of varying durations (Figure 1). These plateaux represent

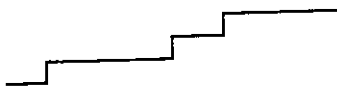


Figure 1. Schematic representation of population increase under the influence of developing technology.

periods wherein little understood and frequently unrecognised physiological and behavioural mechanisms, responding to the close proximity of the population to the acceptable ceiling, check population growth and produce a homeostatic, relatively stable situation (see Wynne-Edwards, 1962). How far such episodes can be perceived

by means of archaeological data has yet to be demonstrated; subsidiary and more detailed short-term models for brief archaeological periods may be employed for this purpose. For general archaeological as distinct from anthropological considerations, however, it is more profitable to treat the upward curve as the long-term norm and the plateaux as temporary and inevitably superseded exceptions.

Stress has been postulated as a principal cause of behavioural change. This argument has been elaborated by some authors with specific reference to the origins of agricultural economies, support being sought for the hypothesis that an exceptional stress situation gave rise to the first experiments in domestication. Stress, however, arising from the relationship between population and resources, occurs repeatedly in the long term and is inherent in the human situation. It has been argued that the various epideictic and physiological responses discussed by Wynne-Edwards and others would tend to maintain populations at levels below which stress might occur. On the contrary, however, the very existence of these mechanisms so widely among men and animals shows that such stress is ever-present in nature, and that while for a given population it may from time to time be relaxed, in the long term it must be viewed as a constantly recurrent factor. There is thus no need to resort to special cases to explain the presence or consequences of stress.



Figure 2. Schematic representation of the changing relationship between population and resources where both these factors are fluctuating.

Even in the short term, the homeostatic plateaux situations, resources will rarely if ever be constant, there being minor fluctuations due to factors beyond human control. If these changes in the available resources are sufficiently prolonged to cause population changes, the two factors will be changing at different rates. Demographic changes possess an internal dynamism which can only respond to feedback mechanisms from the environment much more slowly than the rate at which natural resources are likely to fluctuate. Figure 2 illustrates a situation in which a rise in population ultimately dependent upon an increase in available resources continues after the resources have begun to decrease. In this case increased pressure is brought to bear on the physiological and behavioural barriers to

over-population and thus to over-exploitation of resources. Similarly, the reverse situation can occur, with the population continuing to decline for a period after the resources have begun to recover. Thus even over the short period—archaeologically speaking—of a few centuries periodic stress situations will recur.

Much has been made by the current archaeological generation of the importance of the use of scientific techniques and 'an interdisciplinary approach' in archaeology. It is hoped that this paper will encourage the view that while archaeology needs scientific aids, it is not enough for either participant that science should have the subsidiary rôle of providing only the technological devices with which to answer archaeological questions. It is only by bridging the gap at a theoretical level that a worthwhile discipline centred on man can be built, or that the sciences can make a major contribution to it. This demands the acceptance by archaeologists of the relevance of science theory to archaeological problems, and the acceptance by scientists that archaeology can contribute worthwhile objectives in which they can participate more fully than by the refinement of existing techniques.

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