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Introduction

In a minute there is time
For decisions and revisions which a minute will reverse

T.S. Eliot, 'The Love Song of J. Alfred Prufrock'

One of the unique characteristics of the human species is the possession of highly developed capacities for learning, decision making and problem solving, as T.S. Eliot reminds us. These result in a behavioural flexibility unparalleled in any other species. Although such capacities often require a social context for their use, they reside in the individual. Quite simply, it is these that constitute the source of cultural behaviour. It is remarkable, therefore, that archaeology, a discipline with the human species as its centre and which claims a pre-eminent role for understanding cultural behaviour, has paid scant attention to the processes of learning and decision making by individuals.

How can we gain an adequate understanding of what happened in the past, and why it happened, without making explicit reference to people taking decisions on the basis of accumulated knowledge between alternative courses of action? Certainly individual decision makers cannot be divorced from their social contexts and are part of natural communities, but it is the individual who perceives, thinks and decides. To make a flint arrowhead in one shape rather than another, to hunt deer rather than to collect molluscs, to paint rather than inscribe upon a pot are all decisions taken by individuals upon which our conception of 'cultures' and trajectories of social and economic change are imposed. Such decisions underlie all processes highlighted in recent archaeological thought, whether they be intensification and population pressure or core-periphery networks and peer-polity interaction. These, and other processes, are insufficiently described and understood when lacking reference to the individuals involved. The great changes in human society recorded in the archaeological record – the development of complex technology, the origin of art and agriculture and the emergence of social complexity – are all ultimately underwritten by people making decisions while going about their daily business.

If our explanation for such culture change is to be improved by reference to individual decision making, then the converse is also true: archaeological data and patterns will contribute to understanding the decision-making process itself. Through archaeological data we can investigate the evolution of decision-making

capacities, their characteristics (which are partly defined by the evolutionary context), and the role they play in long-term social and economic change.

These provide, therefore, two complementary challenges for this book. First to develop explanations for problems posed by the archaeological record which make explicit reference to individual decision making. As a subject for this I take the early prehistory of Europe, an archaeological database in which a series of such problems have been clarified by recent syntheses (e.g. Bailey 1983; Dennell 1985; Gamble 1986; Zvelebil 1986b; Rowley-Conway *et al.* 1987; Bonsall 1989). These leave early European prehistory ripe for a new theoretical approach. Hand in hand with this, is an attempt to use the archaeological data to improve our understanding of the decision-making process. These two aims are not easily separated, and it is from their interaction that progress will be most forthcoming – building models of individual decision making, trying these with archaeological data, finding their faults, omissions and strengths, and then revising and developing the model. A learning process of modelling, application and reflection.

The resulting book is both optimistic and audacious. It is optimistic in its intention – to develop explanations which refer to the individual decision maker. The choice of case studies – the Mesolithic of southern Scandinavia in Part 2 and the Upper Palaeolithic of south-west Europe in Part 3 – also require some optimism and a little daring. Both have extensive and complex databases which I hope to simplify without trivialising. It is similarly audacious in that it not only dares to tread into the firing range of archaeological theory, wearing the ready target of an evolutionary approach, but also presumes to offer a new interpretation of Upper Palaeolithic art. Risking the wrath of those hostile to evolutionary theory and those who have devoted themselves to the study of Palaeolithic art is not something I do lightly for I respect their criticisms and knowledge. But I think that such risks are required if archaeological theory and cave art studies are to develop. Those offering symbolic-structuralist approaches have made cogent criticisms of current evolutionary approaches, but offered little of value in their place. If we are to explain the phenomenon of cave art then it must be placed into a wider context of hunter-gatherer behaviour and Upper Palaeolithic subsistence and society. At the 1988 TAG (Theoretical Archaeology Group) conference Richard Bradley warned against the ‘loss of nerve’ in archaeology: So here, with a deep breath and a steady hand, I set out to try and allay his fears.

Individualistic approaches in archaeology

To focus on the individual decision maker is to adopt the methodological individualism of Watkins (1952a,b) in which explanations for social and economic phenomena must make reference to the dispositions of individuals. I do this cautiously, however, noting the criticisms of Gellner (1987), and in a spirit of enquiry rather than dogma. My position is as much pragmatic as philosophical. I simply want to suggest that part of the reason that archaeologists continue to have difficulty in explaining change is that they have neglected one locus for that change – people making decisions about what to do.

Bailey identified the position I take when in fact arguing against a focus on the individual and the concomitant short time scale: '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' (1981b: 112). This stance does not result from egocentrism as Bailey claimed. It simply recognises that the biological basis that constitutes the advanced capacities for learning, decision making and problem solving (which I will refer to simply as decision-making capacities) possessed by humans reside in the individual and are exercised in day-to-day activities. These capacities, which along with symboling and self-awareness are central to the capacity for culture (by no means a solely human phenomenon), provide the dynamic for culture change. Consequently my approach to individual decision making is from an explicitly evolutionary ecological position. It might be noted here, however, that other archaeologists have arrived at the same focus from similar (e.g. Earle and Preucel 1987) as well as markedly different persuasions, particularly those which embrace Giddens' (1985) theory of structuration (e.g. Hodder 1985). I believe that there are significant points of contact between evolutionary approaches and those of structuration, as will become evident below. This is also recognised in the recent work of Shennan (1989). Here, therefore, appears to be a subject to return some unity to theoretical archaeology after recent years of fracas. Not surprisingly, that subject is simply people.

Methodological objections to individualistic approaches may be easier to substantiate than those based on theory. Bailey (1981b) stressed that the nature of the archaeological record is such that it is simply not amenable for discussion about individuals. Archaeological assemblages normally result from the corporate actions of many people, accumulating over many years and subject to serious post-depositional change. These are only meaningful in terms of group or 'average' behaviours. This, however, is to miss the point. A concern with individual decision making does not require the identification of particular characters in the past, although in exceptional circumstances this may be possible (Hill and Gunn 1977). Recognising that the actions of particular individuals are inaccessible to us as archaeologists certainly poses a dilemma, but does not invalidate the need for a focus on the individual if that is required for adequate explanations (Shennan 1986: 334). There is a methodological challenge here – to relate the decision-making processes of individuals to the archaeological record. It is a challenge that appears to have been ignored or wished away by others who advocate a concern with individual action in prehistory. Here, however, it is taken seriously and it constitutes a central theme of this book.

A second methodological problem is more serious. People live in symbolically structured worlds, and act in relation to cultural goals which they may, or may not, be aware of possessing. How can we adopt a focus on individuals without access to the minds of prehistoric people and hence to their symbolic worlds and cultural values? Surely, it is only by knowing their thoughts that we can understand why

Thoughtful foragers

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they chose one course of action rather than another? And just as surely, these minds and thoughts are lost to us.

However, decision-making capacities are ultimately of a biological nature; they have evolved by natural selection and to do so have had to confer some benefit of adaptive value. So by adopting this evolutionary ecological perspective, decision-making processes become amenable for study by prehistorians since we can focus on how they enable people to adapt to their social and natural environments. Now, by viewing human decision making and action in this manner we do not deny that people live in a complex symbolic world of their own creation. Hunter-gatherers, and I suspect people in all types of socio-economic conditions, appear to articulate the natural world (in which I include interactions with other members of their own species) in an ecological and symbolic framework simultaneously and without creating contradictions for themselves (e.g. Blurton-Jones and Konner 1976). As Layton has recently remarked, 'Although the Dorze believe the leopard is a Christian animal they do not leave their goats unattended on fast days' (1985: 451).

The nature of this articulation is not easy to characterise or understand. Gellner (1988) has made a brave attempt. He asks how it is possible that in 'primitive' thought one finds accurate and detailed observation of the world demonstrating an immense empirical sensitivity sitting side by side with what are absurd beliefs about that same world. These beliefs are expressed with the same concepts and language and cannot be explained away as a function of our misunderstanding of their meaning. He argues that one must recognise that primitive thought is multistranded, that it is natural for what we would identify as clearly separate and incompatible activities to be fused and intertwined into one single semantic context. Indeed, he argues that it is our own type of thought today with its inclination to separate and categorise that requires explanation since 'The conflation and confusion of function, of aims and criteria is the normal, original condition of mankind' (1988: 45).

Whether or not this is a valid characterisation of primitive thought, if indeed there is such a thing, it nevertheless emphasises how studies that approach cognition from an ecological perspective with its concern with adaptation and those which focus on symbolism and meaning are neither contradictory nor at loggerheads. They are compatible and require, not preclude, each other. Unfortunately, it is difficult to see how archaeologists can pursue the latter approach when the meanings of prehistoric artefacts are lost except in the most trivial of senses (i.e. those to which Hodder 1987 refers). But the ecological approach is certainly available and can allow us to place the individual decision maker at the centre of our studies and explanations.

For an evolutionary stance the central concept must be adaptation. The implication is not that all actions will play a role in adaptation nor that those which do can in any sense be described as optimal, except again in a rather trivial sense. Adaptation must ultimately refer to reproductive success. When dealing with simple societies I am sympathetic to the position that sees the achievement of

cultural goals, such as the possession of wealth, prestige and the attainment of leadership, as being proximate means by which individuals gain reproductive success (Borgerhoff Mulder 1987). This does not imply that there are easy ways to measure reproductive or cultural success, or of coping with the complicated social strategies that people may adopt. As Robert Hinde has recently remarked, those with a biological perspective must come 'armed with humility in the face of the complexity of human cognitive functioning and social systems if their contribution is to be effective' (1987: 174).

Adaptation can also be studied with respect to the achievement of intermediate goals, notably efficient foraging behaviour. This may either confer direct cultural and reproductive success or provide the individual with the means (e.g. time, state of health) to attain these. Consequently my starting point is decision making in foraging strategies though, as will become apparent, this is not easily divorced from social and cognitive activity once a decision-making perspective is adopted. It is another strength of focusing on individual decision making, that the barriers between the social and economic are not so much broken down as non-existent in the first place.

That my archaeological studies start with faunal assemblages and foraging and work towards social and cognitive behaviour is essentially a pragmatic stance. With the current methods and theoretical approaches available, an initial concern with the direct interaction between humans and the natural environment provides us with a window into the complex world of early prehistoric society. Through this window we can find the individual and by focusing on his/her decision making we can relate social, cognitive and ecological aspects of behaviour. By this means we can integrate what initially appear to be disparate elements of the archaeological record relating to these different spheres of activity. Such integration is perhaps the crux of archaeological explanation (Shennan 1986: 336). So let me be clear. In this work I invoke the decision making of individuals and/or the decisions taken to explain patterning and variation in the archaeological record by integrating elements of that record which were previously unconnected. The importance of making such links in terms of constructing explanations has been stressed by Miller and Tilley (1984a: 151). This is not to suggest that this is the only form that explanation may take.

I must make one further point about the approach I adopt. Once we focus on individuals rather than groups, it becomes immediately apparent that even the most egalitarian hunter-gatherer society is immensely heterogeneous. Each individual is different and what may be adaptive for one may be neutral or maladaptive for another. We can of course classify the members by age and sex and then focus on generic individuals of each class. Now, by seeking the individuals through faunal assemblages we do inevitably find only one type of decision maker, i.e. those concerned with the hunting of large terrestrial game. Moreover, I will be focusing on just a small set of the many decisions that those individuals take. Consequently the picture of prehistoric society created will be distorted by this neglect of other individuals and other decisions. A comprehensive picture can only be constructed

slowly, by focusing on different classes of individual in society and understanding how they interact. That I do not attempt this is simply because I am not trying to do 'prehistoric ethnography'. Rather I want to tackle specific problems posed by the archaeological record by focusing on the individuals and decisions of principal relevance to these.

Evolutionary approaches in archaeology

Evolutionary perspectives in archaeology have recently been heavily criticised. Here I must refute some of the objections, particularly those of Shanks and Tilley (1987a,b), not because they are damning, but because they are fallacious. I shall also distance my evolutionary approach from the 'cultural selectionism' of Dunnell (1980) and Rindos (1984) and make some brief comments on Ingold's (1986) position concerning the relationship between humans and other animals. First I must make clear what a valid evolutionary ecological perspective entails (see also Mithen 1989a).

The most important feature is a concentration on the individual. The notion that a society may somehow be adapted to its environment cannot be founded on any evolutionary basis, indeed it is not clear at all what this could mean. Here, one must agree with Shanks and Tilley: 'Societies, unlike individual organisms, do not have any clear-cut physical parameters or boundaries, nor do societies have conscious problems of self-maintenance or a need to adapt. Individuals may have these characteristics but they cannot be validly anthropomorphised in terms of entire social totalities' (1987b: 155).

Palaeoeconomy (Higgs 1972, 1975) which looked to evolutionary theory for justification was inherently flawed in its theoretical base when individuals and short time spans were neglected. A greater error lies with those who have used optimal foraging theory in anthropology and archaeology, and hence have explicitly adopted an evolutionary stance, but applied the models to groups rather than to individuals (e.g. Belovsky 1987). The sum result of a group of individuals all in some way adapted to their own social and physical environments may be a group extremely out of balance with its natural resources, inefficient in the flows of energy, information and matter through it and generally devoid of any characteristics that may be attributed to its members. Consequently it is not legitimate to speak of prehistoric hunter-gatherer populations in terms of adaptive systems (e.g. Binford 1980).

A second element that must be stressed is that the individuals forming the object of an evolutionary ecological approach are not in any sense passive. Hodder describes this position:

The conception of humanity underlying the behaviourism that dominates the social sciences, and archaeology to a greater extent than most, can be described as passive. The key words within this viewpoint are that people react to external stimuli such that their behaviour reflects the rules and goals of the wider society to which the individual is subordinate so their culture serves the function of adaptation within and between systems (1985: 1–2)

Shanks and Tilley are somewhat more forthright. They argue that an evolutionary approach leaves us with a: 'plastic, malleable cultural dope incapable of altering the conditions of his or her existence and always subject to the vagaries of external non-social forces beyond mediation or any realistic form of active intervention (1987a: 56). This is wrong. A valid evolutionary approach must be founded upon the view of the individual as an active agent, constantly making decisions to alter his/her cognised social and physical environments. When dealing with modern *Homo*, and probably most other species, reference to natural selection must concern the evolution of learning and decision-making capacities resulting in flexible behaviour, with features such as creative thought and action as the driving forces of adaptation. Recent works which have adopted evolutionary approaches to explain cultural behaviour but which concentrate on genetic processes and supposedly analogous cultural ones, such as Lumsden and Wilson (1981), are ultimately flawed. As one reviewer of the Lumsden and Wilson volume was led to comment: 'In the final analysis, behaviour, both human and non-human, is about decision making over more immediate problems of survival and reproduction with more directly measurable proximate consequences, and it is on the details of *these* decision processes and their functional consequences that the new sociobiology will need to concentrate. The genes will look after themselves' (Dunbar 1981: 189).

Consequently the term 'selection' which is frequently invoked by archaeologists when they adopt evolutionary approaches plays little role in this study. It is only when I am dealing with the evolution of decision-making capacities themselves that the concept of selection becomes useful. Arguments which try to use selection to explain the persistence of cultural traits are pushing cultural evolution into a misplaced analogy with biological evolution. We need to deal with people's choices, placing these, not the artefacts, at the centre of our study. This indeed may be construed as artefacts being 'selected' by the choices but such selection is goal-directed and conscious, in direct contrast to the blindness of natural selection. Hence to use the term is not only inappropriate but also confusing.

Rindos (1984) in particular has recently argued for a 'cultural selectionism'. The nub of his argument is that natural selection operates on traits whatever their mode of inheritance, that is, upon the phenotype not the genome (1984: 55). But the error he makes is that while there is a requirement that traits be passed on to offspring for them to be selected, this is simply not the case for cultural (i.e. learnt) behaviour. The offspring of an individual who achieved high reproductive success owing to the possession of a particular set of cultural traits do not necessarily possess that same culture. Genetic traits are passed on, naturally selected by the differential reproductive success of their bearers in the previous generation. General psychological propensities which lead individuals to act in one way rather than another are indeed inherited. It is these, together with a set of unique circumstances, that lead an individual to choose to adopt a particular set of cultural traits. Rindos fails to justify his assertion that 'the fact that human cultural behaviours are not the result of genetic differences does not imply that the traits could not have been the result of selection' (1984: 61). This is exactly what *is* implied unless we distort the

meaning of natural selection and we have here a contradiction inherent in a cultural selectionist stance. Consequently Rindos is wrong that we do not have to deal with problem solving and goal-directed behaviour since it is through these processes, which evolved by natural selection, that cultural variability is created and particular traits are chosen, or not chosen, to persist through time. Decision making has a central role to play in explanations of both human (Flannery 1986a: 5) and non-human behaviour (e.g. Dunbar 1984: 3–4).

The failure on the part of social theorists, as well as cultural ecologists, to focus upon these active characteristics of decision-making processes derives partly from the idea that ‘adaptation’ should be seen as a particular state that can readily be achieved. A more useful viewpoint is to see adaptation as an active process of becoming, rather than an achieved and static state of being. It is indeed a matter of confusion that the term adaptation can refer both to a process and to an end product (Dunbar 1982). When this has been recognised in archaeology the attitude appears to be one of muddling along (e.g. Gamble 1984: 238) so that absolutely everything is subsumed by the term and nothing explained. Archaeologists should focus on the first of these, adaptation as a process, and this will almost incidentally rid us of the optimality issue. The physical environment is in a constant state of flux, as is the social environment in terms of the behaviour of other individuals. People are also severely limited in their knowledge of the possibilities and consequences of different courses of action. It is of little value to suppose that people are engaged in activities which maximise their inclusive fitness since the world simply does not stand still long enough for them to achieve this.

This leads us to one of the principal problems with the use of optimal foraging theory in archaeology, and indeed of optimality models in general, including applications to explain technology (e.g. Torrence 1989b). These approaches explain the static state of individuals or groups (and their material culture) with their environment at one particular point in time by reference to functional relationships (e.g. energy maximising, risk minimising) but cannot address how these states are arrived at and will be maintained as the environment changes. As archaeologists we should be concerned with change and consequently our most useful evolutionary perspective is one that emphasises adaptation as a dynamic process rather than a static state. The same critique can be made against other approaches to hunter-gatherer subsistence and settlement patterns outside of the strict optimal foraging framework. For instance Rowley-Conwy (1987) has summarised a common ecological stance in the study of prehistoric foragers in which a series of sites within one region are analysed as to the seasonality and purpose of occupation. These are then pieced together like a jigsaw to reconstruct the socio-economic system – an attempt at prehistoric ethnography. Only then is the question of change addressed from what has now been fossilised as a static system in a harmonious balance with the environment. The studies of site seasonality and function are clearly essential but these must be conducted in a framework which views the system as a continually changing entity composed of dynamic, creative and interacting individuals.

By doing this we avoid the problem of tautology – the fittest survive and those

that survive were the fittest – a further criticism levelled by Shanks and Tilley (1987b: 153). By concentrating on the process of adapting we are specifying *how* ‘the fittest survive’, rather than taking this as a truism (Borgerhoff Mulder 1987). We must agree with Hodder therefore, that ‘Any adequate understanding of social change must take into account the knowledgeability of human actors, that is, their monitoring and observation of intended and unintended consequences of their actions’ (1985: 3) since this is at the heart of the adaptive process.

Similarly there must be agreement on another issue that Hodder (1985) has recently stressed – that the actions of individuals can only be studied in a historical context. It was a feature of the cultural ecological approach, falsely justified by reference to evolutionary theory, to dismiss or neglect historical factors, as Hodder noted. Yet when adaptation is seen as a process, and actions dependent upon experience and knowledge, the historical context must be essential to any explanation.

If those critical of an evolutionary ecological approach were to accept that this does in fact lead to a concern with active individuals in specific historical contexts, rather than with ill-founded notions of societal adaptation and equilibrium, I fear that they would reject this as trivial. They may argue that even though the biological underpinning of human decision making and symbolic capacities cannot be denied, these have no consequences for the manner in which these capacities are used. This would be Shanks and Tilley’s argument: ‘a biological evolutionary perspective, when transferred to the activities of human beings, collapses with the redundancy argument, i.e. what people spend most of their time doing is completely redundant in terms of conferring any possible selective benefit,’ (1987a: 56).

There are several problems with this position. First it makes an erroneous assumption that evolutionary perspectives necessarily become redundant when people’s actions have no selective benefit. Many actions appear to be of this character but these may be the consequences of using capacities in contexts different from those in which they evolved. For instance Humphrey (1984) argues that stamp collecting and listening to Beethoven, which appear to be patently without selective benefit, arise from the exercise of capacities for classification, essential to learning, in new contexts. These are exercised since, like eating and sex, they are essential to survival and hence we have evolved to enjoy using them. As he states, ‘Once nature had set up men’s brains the way she has, certain unintended consequences followed’ (1984: 133). To explain these unintended consequences we must understand and make explicit reference to the evolution of mental capacities.

Similar instances occur when actions that are either neutral or maladaptive arise owing to the expression of propensities that were functional in their evolutionary environment but are no longer so. Hinde (1987: 171) cites the example of irrational childhood fears. Again, understanding comes from examining the context in, and the processes by which, such psychological propensities evolved and the current context in which they are applied.

A further problem with the supposed ‘redundancy’ argument is that this is an *a*

priori dogmatic statement about human actions. It would be more appropriate to recognise the complexities of human actions and to be prepared to engage in serious academic study of these, whether or not one adopts an evolutionary perspective oneself. Whether the activities that people engage in do or do not confer some selective benefit can only be ascertained by study, and cannot be so declared by some form of inspired knowledge on the part of Shanks and Tilley. If it turns out that they are correct, then that is an interesting finding not only for the social but also for the natural, sciences. Whether this is the case, however, remains to be seen.

A further objection that is often made against evolutionary approaches in archaeology, and in the social sciences in general, is that they deny free will by advocating a biological determinism. Related to this is a view that comparisons with other animals are somehow degrading. Such views arise from a belief in fundamental differences between humans and other species. One cannot deny that human beings are unique because of the great complexity of their cognitive processes and possession of language. As such, direct comparisons with other species may be limited in value and misleading (Hinde 1987). Yet these differences do not invalidate an evolutionary approach or create the unbridgeable gulf that Shanks and Tilley suggest: 'we would argue that people do not behave in the sense that animals behave . . . they *act* and the difference between behaviour and action is of fundamental significance. Humans must be conceived as sentient social beings living in a symbolically structured reality which is, essentially, of their own creation' (1987a: 55).

The view that animals are not sentient adopts the position of Descartes – animals are simply automata. Today, little basis can be found for such a stance. A distinction between instinctive (i.e. genetically determined) behaviour and learnt behaviour, or between nature and nurture, is no longer tenable (Bateson 1983; Gould and Marler 1986). Many animals, including insects, are prodigious learners, while the learning process and things learnt are guided by the genetic make-up of that species. In addition, recent work has advanced the case for elements of language, consciousness and culture in other species (e.g. Bonner 1980; Ristau and Robbins 1982; Griffin 1984; Dunbar 1984: 230–5). Moreover, members of other species, particularly primates, often engage in sophisticated social strategies involving the manipulation and deception of others (e.g. Dunbar 1984). None of this work denies the uniqueness of the human species; it simply shows how the unique characteristics are nevertheless on a continuum with those of other animals (Foley 1987a; Midgley 1980). Non-human animals are not automata, though none may have as complex a set of conceptual abilities as humans. But 'conceptual abilities' and 'complexity' have no inherent value in themselves. Other animals have better powers of sight and smell. Are they degraded by comparisons with humans?

Being concerned with the similarities and differences between humans and other animals I must make a brief reference to the recent set of essays by Ingold (1986) since this issue constitutes their principal theme. Ingold provides some of the most stimulating and informed discussion of tool use, storage, mobility and