Human Behaviour and the Scientific Method

The productivity of cross disciplinary fertilisation is in no way diminished by the contents of the articles that stimulated this discussion. Not only does the application of evolutionary ecological theories to the study of human behaviour initiate new areas of research for scholars of human behaviour it also stimulates discussions of the underlying theories and assumptions of such disciplines as anthropology and archaeology. For the purpose of this discussion no distinction will be made between anthropology and archaeology, in the fashion of North American scholars, both will be considered the study of humans. This discussion will attempt to address the application of evolutionary ecological theories to the study of humans generally.

In the first instance some key points in the articles by Hames and Vickers (1983) and Beckerman (1983) will be outlined. The question of technology will be addressed by suggesting that material culture is simply an extension of the human phenotype (Maschner & Mithen 1996: 6). This will be followed by a discussion of some key terms from evolutionary ecology and their possible usefulness. The discussion will then move to the scientific method and the application of empirical research and its use in anthropology. Finally it will be argued that, with some adaptations and clarifications, the adoption of theories from the natural sciences will enlarge the body of knowledge already accumulated by anthropology.

> Behavioural ecology provides a powerful and complex set of ideas for understanding animal behaviour in terms of its evolutionary consequences. In principle, since humans are a species that has evolved through natural selection, like any other, the same ideas can be applied to

> the study of human behaviour. Whether what people do corresponds to the predictions derived from optimality theory in particular cases is a matter for research rather than dogmatic assertion one way or the other (Shennan 2002: 5).

The articles

It must initially be noted that the article by Hames and Vickers (1983) is the introduction to a larger collection of articles and consequently attempts to outline the arguments of other authors (of cause the reader would know this). It is suggested that the arguments are not suffi ciently developed in the introduction to critically evaluate and are also far too broad for this discussion.

At the start of their article Hames and Vickers notes that although studies of the Amazonian region had expanded knowledge of the area, there was a t the time limited empirical data (1983: 1). The authors go on to suggest 'that the ecological approach offers powerful tools for the analysis of … human adaptation in Amazonia' (Hames & Vickers 1983: 1). After a description of the

In section three of their ar ticle Hames and Vickers outline some of the various environmental co nditions such as soil types and vegetation arguments for environmentally deterministic interpretations of Amazonian distribution the authors suggest studies of individual communities are used 'to

cultural evolution. They site a plethora of authors claiming that poor soil test hypotheses concerning general adaptive processes in Amazonian limited the development of agriculture , or that the lack of pro tein restricted societies' (Hames & Vickers 1983: 7).

sociocultural development. Hames and Vickers notes that th e 'Amazonian

habitat has been cited … as a prime example of how the environment determines and limits sociocultural evolution' (1983: 7). It is argued that although the environment is clearly a limiting factor, an individual can not eat pig if there are no pigs, it is not the only limiting or selective factor in culture change. This statement is preposed for reasons outlined below.

In section four 'Environmental Models of Amazonian Ad aptive Behavior' the authors discuss 'variability in particular cultural traits' (Hames & Vickers 1983:12). They outline some of the arguments used to explain warfare and settlement patterns and the relation with resources such as protein in Amazonia. These arguments and the theories that inspire them should complement the dialogue on human behaviour from traditional anthropologists, adding another tool to the social science kit. Hames and Vickers also highlight some of the problems encountered by researche rs initially suggesting that the lack of high quality data is a serious limiting factor for those interested in ethnographic ecology (1983: 14). It is assumed that since the time of publication more data has been collected. One wonders if their volume. They discuss the different approaches to protein capture and the another of the problems indicated by the authors has not compounded in the time since publication; that is, culture change associated with cross -cultural

Hames and Vickers sketch some of the approaches used by contributors to

various conclusions drawn from the research. It is argued that the variety of conclusions highlights the cultural variability in the region and the need to incorporate the research in to the general anthropological dialogue. It is suggested that more conventional anthropological research is necessary to answer the question of why members of group A. are time minimizer and members of group B. protein maximisers. The agent of selection seems to be more than just the natural environment. As Irons notes, 'The specific events of history become determinants of human behaviour, which are as important as current environmental circumstances (1979: 37). Hames and Vickers go on to suggesting areas for further research that would not only add to the cultural ecology knowledge base but should also stimulate more traditional anthropologists to attempt to answer the abovementioned question and other s like it.

The article is concluded with a discussion of adaptation and although the authors point out the lack of a consistent definition of it in anthropology they suggest 'adaptation is the maintenance of an equilibrium between people and

the totality of their environment' (Hames & Vickers 1983:24). An attempt will be made to define adaptation below but one wonders if the association of adaptation with equilibrium is not misguided. It could be argued that western cultures are highly adapted, considering the reproduction and spread of said cultures, but it seems very hard indeed to argue that western cultures are in equilibrium with the totality on their environments. In contrast to the authors of this article it is suggested "balance" and "efficiency" are inappropriate definitions of adaptation as the terms seem to have culturally loaded meanings. Something akin to "primitive" and "advanced".

The second article 'Carpe Diem: An Optimal Foraging approach to Bari Fishing and Hunting' by Beckerman is an attempt to apply an evolutionary ecological theory to a portion of a group to assess whether the activity conforms to, or contradicts 'central tenets of optimal foraging theory' (1983: 269). In the first instance the productivity of this approach is questioned. It is argued that separating one activity, protein acquisition, from the suite of subsistence activities produces a 'just-so' narrative (Bettinger & Richerson

1996, O'Brian 1996). Although this narrative is interesting in its ability to demonstrate the application of optimum foraging theory to human activity, without including all substance activities it is unclear as to whether the Bari are optimising in their subsistence activities. One wonders if the Bari males are optimisers or if the Bari culture is optimising.

Beckerman's justification of his data collection technique highlight one of the problems this student had with the article. Although it is conceded that the data was not collected for the specific purpose the article used it for, the lack of indigenous voice disregards the cultural motivation for the behaviour. For reasons that will be discussed, it is suggested that the rationale the Bari give for hunting or fishing is as important to the question of optimisation as the amount of fish. It is acknowledged that Beckerman points out that asking 'our subjects' is advantageous (1983: 2 99). The above notwithstanding Beckerman clearly demonstrates the technique and application of evolutionary ecological theory for the study of human behaviour. He also illustrates the ability of ecological theories to generate questions and alterations that can be further studied. It is this ability that is the major strength of ecological theories when applied to human behaviour (Bettinger &

On technology

It is argued that technology is a part of human culture that can not be separated in any meaningful way when discussing cultural evolution. Although

technological artefacts are physically separated from the human body they can not be separated from culture as 'cultural products are … only near-decomposable' (Graves-Brown 1996: 176). The proposition is that cultural traits, such as technologies and ideas, are like parts of a clock that need to interact with each other to function. In the same way all the aspects of culture form a matrix supported by 'the scaffolding of social development' (Graves-Brown 1996). It is suggested that when approaching culture change from an ecological perspective we 'treat artefacts as part of the human phenotype' (Maschner & Mithen 1996: 6). Basalla (1988) convincingly demonstrates that technology changes or evolves rather than being spontaneously generated and suggests that technology changes as culture changes lending additional weight to the extended human phenotype proposal.

> The organic evolution of the capacity for culture had, at least at one time, important implications for the actual process of cultural evolution [and the] capacity for culture continued to evolve not merely because it enabled superior adaptations but also because it was used to produce superior adaptations (Durham 1979: 43).

Some Terms

The application of evolutionary ecological theories to the study of humans and culture change requires some clarification of the terms used in the theories. In

the first instance it seems acceptable that the terms evolution and change be used interchangeably. Although it is noted that evolution as originally used in Darwinian Theory meant change through time from less to more complex, this student's reading of current usage indicates that the pejorative aspect has been dropped and the term now simply means change through time. It is considered an axiom that change through time has occurred and 'the human species is a product of biological evolution' (Maschner & Mithen 1996: 3, also Durham 1979, Shennan 2002 and many others).

The discussion of change in anthropology and evolutionary ecology has forced both disciplines to question what initiates change and it is possibly this issue that is evolutionary ecology's most useful contribution to anthropology. Natural selection hypotheses are still being tested in ecology (Bettinger & Richerson 1996) but the idea that some process selects characteristics for reproduction is recognized and although the process is still being debated (Graves-Brown 1996) this idea of selection can profitably be applied to culture change. It could even be suggested that the use of the term selection, because it 'carries with it an anthropomorphic sense of volition and action'

(Graves-Brown 1996: 166), is at least as applicable to culture as it is to ecology. It is the question of the means of selection that should be most interesting to anthropology because 'unlike mutation in biological evolution, human choice acts not only as the source of variation but also as the mechanism of selection' (Maschner & Mithen 1996: 10).

'Social relations and traditions, no less than the rocks and streams of nature's colder side, formed the environment in which selection operated' (Richards 1987: 484). This, it is argued, is why theories borrowed from ecology and applied to culture change can assist in our understanding of human behaviour. It is noted that 'a large part of the environment to which individuals adapt consists of other individuals and their expected behaviour' (Irons 1979: 37). It seems that the question of why one cultural characteristic might be selected and not another would best be answered by anthropologists considering the body of knowledge already accumulated by that branch of learning.

The issue of selection leads, thanks to ecology, to the concept of adaptation. In ecology the idea is that a change or adaptation is selected or rejected depending on its differential benefit to the organism. It is suggested that, in anthropological use, adaptation simply means behavioural variation in response to something. Anthropologists, it is argued, should include the cultural and natural in their concept of environment when considering

adaptation. ‘Behaviour is the product of both genetic and environmental [natural and cultural] influences which interact in complex ways throughout the life history of an individual’ (Chagnon 1979: xvi).

It seems reasonable to suggest that an adaptation might be considered culturally advantageous even if it offers no advantage in relation to the natural environment.

The scientific method

It is understood that the scientific method involves collecting empirical, quantitative, data and using this data to generate laws and test hypotheses (O’Brian 1996). It is suggested that anthropology has collected much data but few laws of human behaviour have been generated. Although one wonders whether laws of human behaviour exist, it seems that if they did evolutionary ecological theories might be able to determine them. The articles above discussed illustrate the scientific method of testing theories of human behaviour with empirical data. It appears to be the strength of the scientific method for testing hypotheses that is of most use to anthropologists, even if no laws of human behaviour are found. It would be of interest to test evolutionary ecological theories against factors within a culture that might be selecting agents, such as spiritual belief or moral codes.

> Sociobiology is concerned with the application of ecological theory to the analysis of social behaviour…it focuses on the contribution of ecological adaptation processes to the variability observed in foraging or social behaviour (Smith & Winterhalder 1981: 1).

The articles examined limit their discussion on adaptation to environmental selection factors. It is argued that anthropology should expand the term environment to include culture when testing selection models. The argument is that not only the natural environment but also the cultural environment form the totality of the environment that has to be adapted to. It has been suggested that technology, as a component of culture, is selected for and by adaptation and should be treated as part of the human phenotype. The articles demonstrate the utility of evolutionary ecological theories applied to human behaviour. They illustrate the scientific method's ability to test hypotheses and generate discussion. Analogies borrowed from evolutionary ecology are useful for stimulating debate and give anthropologists another instrument with which to analyse human behavioural variability.

Works Cited and Consulted

Basalla, G. 1988, *The Evolution of Technology*, Cambridge, Cambridge University Press.

Beckerman, S. 1983, Carpe Diem: An Optimal Foraging Approach to Bari Fishing and Hunting. In R. Hames and W. Vickers (eds) Adaptive Responses of Native Amazonians. New York, Academic Press. pp 269-299.

Bettinger, R. L. & Richerson, P. J. 1996, *The State of Evolutionary Archaeology: Evolutionary Correctness, or the Search for the Common Ground*. In Maschner, H. D. G. (ed), Darwinian Archaeologies. New York, Plenum Press. pp 221-231

Chagnon, N. H. 1979, Prologue. In N. Chagnon & W. Irons (eds), *Evolutionary Biology and Human Social Behavior*. Massachusetts, Duxbury Press. xv-xvi.

Durham, W. H. 1979, *Towards a Coevolutionary Theory of Human Biology and Culture*. In N. Chagnon & W. Irons (eds), *Evolutionary Biology and Human Social Behavior*. Massachusetts, Duxbury Press. pp 39-58.

Durham, W. H. 1981, Overview: Optimal Foraging Analysis in Human Ecology. In E.A.Smith, & B. Winterhalder (eds), Hunter-Gatherer Foraging Strategies. Chicago, The University of Chicago Press. pp 218-231.

Graves-Brown, P. 1996, In Search of the Watchmaker. In Maschner, H. D. G. (ed), Darwinian Archaeologies. New York, Plenum Press. pp 17-32.

Hames , R. & Vickers, W. 1983, Introduction. In R. Hames & W. Vickers (eds), Adaptive Responses of Native Amazonians. New York, Academic Press. pp 1-24.

Irons, W. 1979, Natural Selection, Adaptation, and Human Social Behavior. In N. Chagnon & W. Irons (eds), *E*volutionar*y* Biolog*y* and Human Social Behavior. Massachusetts, Duxbury Press. pp 4-38.

Maschner, H. D. G. & Mithen, S. 1996, Darwinian Archaeologies: An Introductor*y* *E*ssa*y*. In, H. D. G. Maschner (ed), Darwinian Archaeologies. New York, Plenum Press. pp 3-14.

O'Brian, M. J. 1996, The Historical Development of an *E*volutionar*y* Archaeolog*y*. In H. D. G. Maschner (ed), Darwinian Archaeologies. New York, Plenum Press. pp 17-32.

Richards, R. J. 1987, Darwin and the *E*mergence of *E*volutionar*y* Theories of Mind and Behavior. Chicago, Universit*y* of Chicago Press.

Sahlins, M. 1976, The Use and Abuse of Biolo*g*y: An Anthropological criti*q*ue of Sociobiolog*y*. Ann Arbor, The Universit*y* of Michigan Press.

Shennan, S. 2002, Archaeolog*y* and evolutionar*y* ecolog*y*, World Archaeolog*y*, Vol. 34, pp 1–5.

Smith, *E*. A. & Winterhalder, B. 1981, New Perspectives on Hunter -Gather Socioecolog*y*. In *E*. A. Smith, & B. Winterhalder (eds). Hunter-Gatherer *F*oraging Strategies. Chicago, The Universit*y* of Chicago Press. pp 1 -12.