Sociobiological Hypotheses Explored

Evolutionary Biology and Human Social Behavior. An Anthropological Perspective. Papers from a meeting, 1976. NAPOLEON A. CHAGNON and WILLIAM IRONS, Eds. Duxbury (Wadsworth), North Scituate, Mass., 1979. xvi, 624 pp., illus. $15.95.

Chagnon and Irons's edited collection contains papers by anthropologists and biologists who are interested in using principles of evolutionary biology to organize understanding of human social life and culture. Much of what has appeared on this theme since the publication of E. O. Wilson's *Sociobiology: The New Synthesis*, in 1975, takes the tone of statements of belief or commitment for and against sociobiology, laced with illustrations. Chagnon and Irons's collection is notably unprovocative in tone, avoiding even the term "sociobiology" in most contexts, including the title. The emphasis in this book is on testable hypotheses drawn from theories of inclusive fitness, parental investment, and reproductive value, examined empirically either within particular societies or cross-culturally. The dramatic controversies of sociobiology seem to have motivated a great deal of extremely interesting research, most of which is reanalysis of existing and well-known data in social anthropology. Whether the simple and powerful principles of evolutionary biology will eventually be shown to account for much or little of the variance in human societies is far from clear. But this book leaves no doubt that there are important and sharply focused questions that can be asked and tentatively answered by use of hard-won anthropological knowledge of a range of societies.

Perhaps the most interesting exemplar of this kind of research is the paper by Mildred Dickemann on female infanticide in stratified societies. Dickemann notes that hypergamy, or marriage of men to lower-status women, is a frequently observed feature of stratified societies. This pattern leaves two groups with difficulties in finding mates, the highest-status women and the lowest-status men. Concentrating on high-status groups, Dickemann reviews ethnographic and historical data from China, India, and Western Europe to see whether parental investment is concentrated upon male children in these strata. Indeed it is, as has long been recognized. But whereas feminist scholars have concentrated upon the injustice of the situation, and Wilson has elsewhere focused upon the universality of male dominance, Dickemann uses the variable reproductive value of offspring of the two sexes in various strata to predict the degree of expected parental investment and then compares the expected with the observed extent of female infanticide and neglect in these groups. Although the evidence is not conclusive, it is certainly persuasive that more detailed research should be done, and Dickemann brings the formulation of the problem to a new level of sophistication.

Similarly Jeffrey Kurland notes the frequently observed phenomena of the role of mother's brother, who in certain societies takes on many of the functions elsewhere assigned to fathers. Most adult men, of course, have both sons and nephews. Inclusive-fitness theory predicts that they will invest in the group to which they have the closest genetic relationship. Fathers share 50 percent of their genes with their sons, and uncles share 50 percent with their sisters and only 25 percent with their nephews. But, when men cannot be certain of the paternity of their wives' children, average relatedness might be higher with nephews, where at least the 25 percent of shared genes is certain. Hence Kurland investigates the degree of paternal certainty in societies where the mother's-brother relationship is stressed, as opposed to those where the role of father is dominant.

Following a similar strategy, Irons notes that, although the roles of kin-based societies are remarkably invariant, the particular dyads (two-person role pairs, such as mother-daughter, husband-wife, or nephew-mother's brother) that are culturally designated to carry out tasks of work and mutual support or competition vary widely. Drawing upon some of the best-known case studies in anthropology, the Tiwi, the Nayar, and the Yanomamo, and on his own studies of the Turkmen, Irons uses inclusive-fitness theory to organize a wide range of seemingly disparate observations into a coherent whole.

Chagnon, whose detailed empirical studies of the Yanomamo are voluminous, uses principles from evolutionary biology to organize data on three questions he investigated: the kinship-relatedness of the opposing sides in a village fight; the sex-ratio variations between villages particularly as related to female infanticide; and the distribution of reproductive-success rates for the two sexes.

In all of these anthropological investigations of principles of evolutionary biology, investigators use a small number of well-studied cases to explore the problems. While such investigations, based upon small and undoubtedly biased samples of the population of societies, cannot be interpreted as rigorous tests of hypotheses, they permit attention to complex problems of confounding variables, questions of motives for behaviors, and so forth. Contributions from biologists in the same volume differ strikingly in the degree of attention that is paid to detailed analysis of cultural and motivational problems.

In an introductory theoretical essay, biologist Richard Alexander makes it clear that he views culture as merely the sum of individual motives. Unlike the theoretical essays by Irons and by William Durham, Alexander's rarely makes it clear when the argument is intended to apply to human social behavior in contradistinction to that of any social species. The discussion of elements of culture is flat: Alexander writes as though language and symbolism are a single, undifferentiated process that occurs in all societies, ignoring differences between them and allowing no causal role for such differences.

In the substantive papers, too, those by biologists as opposed to anthropologists stand out by their attention to explaining central tendencies while ignoring differences. In a paper by Alexander and four colleagues, entitled "Sexual dimorphism and breeding systems in pinnipeds, ungulates, primates, and humans," the argument is made that polygamous breeding systems tend to increase sexual dimorphism, because competition between males leads to selective advantages for the largest males. In a series of figures for each of the genera considered, mean harem size is plotted by the ratio of mean body length of adult males to that of females, with species as the units. When the authors come to humans, of course, species cannot be the units, so they substitute societies, or rather the data tabulated for various groups from the Human Relations Area Files. That data source is of course extremely convenient, but use of it begs a whole series

of crucial questions in the application of evolutionary biology to human groups, answers to which can be taken for granted when species are the units. For humans we need to know not only the degree of polygamy in the group but the depth of time in generations or in years that the practice has had a chance to act upon the gene pool. And even the height measures are problematic; changes in diet and medical care have altered height for both sexes radically in the recent past for many or most groups, so the year of measurement is important.

The biologists differ from anthropologists in their treatment of motivation of behavior, too. While anthropologists cautiously distinguish what people say from what they do, and define their own task variously as etic or emic, biologists cheerfully attribute causal significance to motives that people deny having or that are attributed to creatures whose motives cannot possibly be known. For instance, Bernds and Barash discuss as a cause of fetal death the altruism of one identical twin, who maximizes inclusive fitness by dying. In anthropology this sort of thing is referred to as a "just so story," and it is odd to see it offered as a part of what is undoubtedly a different and valuable perspective.

E. O. Wilson's own contribution is a brief concluding statement entitled "Biology and anthropology: a mutual transformation?" in which he suggests that biochemistry may serve as a model for a new hybrid field that may emerge to deal with the interrelations of genetics, environment, and social behavior. At least in the short run, it is far more likely that disciplinary boundaries will persist, while the thinking of scientists on both sides is influenced by contact with the other. The biologists bring to the problems a body of literature and models that have thus far proven to be highly productive of new research and stimulating of new ideas. At the same time they seem to be innocently ignorant of much of the complexity of human social life and cultures that sociobiology sets out to explain. The anthropologists seem to be resisting biological reductionism while accepting questions from biology. In this context, William Durham's ambitious theoretical essay in which he attempts to broaden evolutionary theory to include joint effects of both Darwinian genetic evolution and Lamarckian cultural evolution, to be evaluated by the same criteria of adaptation, is intriguing, if not entirely convincing. One looks forward to a fuller treatment in the future.

The final word in the volume is properly Chagnon's. Reflecting upon the philosophical traditions of anthropology and the ways in which these intersected with assertions in sociobiology to generate controversy, Chagnon insists that the only principles needed to pursue biological questions in anthropology have been widely accepted long ago. Nature and culture cannot be mutually exclusive; "causeless spontaneity" cannot be an explanation; and evolutionary biology, which is granted to be the major causal force of all the varied forms of life, must apply to human life as well. Investigation of just how these simple forces apply to or are evaded by human beings is a major challenge.

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Geology and Culture

Images of the Earth. Essays in the History of the Environmental Sciences. Papers from a conference, Cambridge, England, April 1977. L. J. JORDANOVA and ROY S. PORTER, Eds. British Society for the History of Science, Chalfont St. Giles, England, 1979. xxii, 282 pp., illus. £6.55. BSHS Monographs, 1.

This collection of papers prepared for a conference intended to represent new perspectives in the history of geology raises questions of considerable urgency in the history of science. Historians of science used to find their problems within science itself. They studied clearly defined events, such as the 19th-century controversy over the age of the earth, constructed narrative accounts of the evidence cited and the hypotheses advanced, and offered explanations why the individuals involved took the positions they did. Studies of this sort stimulated lively exchanges over the relative importance of logical and evidential factors, which were labeled "internal," as opposed to cultural and social factors, labeled "external." While this debate occasionally became confused, it helped bring about the recent reconceptualization of the nature of science and of the ways in which old theories are displaced by new ideas. It now appears that, if this book's call for a new departure is heeded, that phase of the history of science is at an end.

The one theme that binds these essays together is the desire to free the history of science from the order of knowledge created by science itself. The essays are grouped into sections on Geology and Belief, The Language of Environmental Science, Earth Science and Discipline Boundaries, and The Social History of Geology. The editors distance themselves from other works on these subjects by proclaiming their desire to transcend "the conventional straightjacket of the 'history of geology.' " The biographical examination of individual achievements is eschewed, as is the explication of historic controversies, while the more elusive linkages between science and its surrounding culture are emphasized. In short, exploration of the long history of geology has been replaced by a series of episodic forays into the hinterland.

Apparently the ultimate goal of this endeavor is to dissolve science itself into its cultural context. The editors call for greater emphasis on the "fundamental political and economic questions which are commonplace in the general historical literature," and historians of science are once again urged to make greater use of "the tools developed by historians, indeed by social scientists generally." Then, having insisted that all aspects of their subject, and indeed their subject itself, are historically problematic, the editors praise their collaborators for their intentions. Hugh Torrens's essay on geological communication in the Bath area and Paul Weindling's on the importance of utility in early-19th-century English geology may not be as "pioneering" as is claimed, but both are valuable additions to the history of British geology. Several other authors, such as G. N. Cantor and David Allen, attempt to transform their competent special investigations into case studies by invoking theories of language and of the sociology of disciplines. Such efforts, like the editors' obligatory mention of Foucault's archeology of knowledge, are better evidence of the contributors' ambitions than of the power of their method.

The individual essays vary considerably in quality. All are based on detailed historical research, much of it carried out during the preparation of doctoral dissertations, and several, such as Martin Rudwick's on Lyell's use of concepts drawn from the human sciences and W. H. Brock's on the shifting boundary between geology and chemistry, reflect the maturity of their authors. Students of 18th- and 19th-century British geology should note that the range of subjects examined is quite broad. R. Grant and John Brooke provide two studies of the relations between natural theology and geological theory, and Marcia Pointon and L. J. Jordanova examine the connections between geology and landscape painting and geology and environmental medicine. The level of theo-