BOOK REVIEWS

Sex in the Making of Man

Sexual Selection and the Descent of Man, 1871-1971. Edited by Bernard Campbell. Pp. x+378. (Heinemann: London, June 1973.) £6.50.

DARWIN'S *The Descent of Man and Selection in Relation to Sex* contained, as its name suggests, two largely independent works. The two parts are held together by Darwin's conviction that many of the differences between the races of man cannot be explained as adaptations to different environments (and hence by natural selection), and therefore must be explained by sexual selection, and in particular by different concepts of human beauty. Few people today would take this argument very seriously. One might therefore fear that a collection of essays celebrating the centenary of Darwin's book would lack unity to an even greater extent than most such collections. In fact, this fear is not realized; these essays form a sustained and coherent attack on a related group of problems. The credit for this must go in part to the editor, Bernard Campbell. He has chosen his authors skilfully, and has given each of them space to develop his ideas. It is also in part the result of the happy accident that history has brought the two parts of Darwin's book closer together. We can now see that if we are to understand human evolution, we must also understand the evolution of human breeding systems, and the relevance of these systems for ecology and sociology on the one hand and for individual psychology on the other.

In the first two essays, Eiseley puts Darwin's work in historical perspective and Simpson summarizes what is known of man's physical evolution. This is followed by an essay by Campbell himself, relating man's physical evolution to his ecological status. In brief, he suggests that *Australopithecus* was confined to a tropical environment, that with *H. erectus* man's ecological range was extended to temperate regions, and with *H. sapiens* to the Arctic. There follows a clear summary by Dobzhansky of the genetics of human racial differences, and an essay by Mayr introducing the problem of sexual selection. The latter seems to me a sad and uncharacteristic muddle. The phrase "sexual selection" has been applied to many different selection processes, and Mayr sets out to distinguish these from each other and from natural selection. Unfortunately he never gets clear about

the most fundamental distinction—that between intra- and interspecies selection—and ends up by apparently equating natural selection to the latter. "I feel that here is an area that has not been thought out completely", he writes; he can say that again.

Ehrman reviews the evidence on the genetic basis of sexual selection, and in particular her own fascinating work on the "rare male" phenomenon, whereby a female fruitfly, offered a choice of kinds of male, will prefer to mate with whichever kind is least common. There follow three brilliant essays, by Trivers, Selander and Crook, on the significance of sexual selection; together these form the essential core of the present volume. Trivers's fundamental theme is that parental investment of the sexes is the key variable controlling the operation of sexual selection. The argument seems to me correct and illuminating. The essay is densely packed, both with theory and data, and is not always easy to follow; I hope he will expand it into a book. I think he makes some mistakes; for example, can it be true that "American women tend to marry up the socioeconomic scale", unless upper class American women stay unmarried? (What is true—at least in Scotland—is that tall women tend to marry up the scale.)

Selander starts with a review of Darwin's own contribution, including a sympathetic discussion of his mistakes. He then reviews sexual dimorphism and selection in birds. His central argument is that ecological requirements determine breeding systems, and that these in turn influence sex ratios and sexual dimorphism. This essay too is hard work because so full of illustrative data, but again the effort is worth it. Crook discusses sexual selection in primates, and, like Selander, interprets breeding systems as ecological adaptations. He is less convincing, because as yet less is known of the ecology and ethology of primates than of birds, but his essay is packed with fascinating problems. For example, he describes how, in the Old-World monkeys, males often mimic female genital characteristics as a method of warding off aggressive attacks from dominant males. But why should it be that in the New-World monkeys, the male genitalia are sometimes used as signals in aggressive inter-male displays and are mimicked by displaying females? Crook discusses

the role of sexual selection in human evolution. Here the fundamental difficulty is that we do not know the breeding system of our recent ancestors. Crook discusses Desmond Morris's thesis that much of human evolution can be understood as a series of adaptations making sexual intercourse more rewarding and hence cementing the pair bond. Crook finds the idea plausible, but remarks that "the fact that Morris's story hangs together particularly well may tell us more about his skill as a writer than about the validity of his views". This leads him to discuss how evolutionary hypotheses are to be validated, and to suggest that they must be tested at levels additional to that which originally suggested them.

This last methodological proposal might be pondered by Fox, who contributes an essay on sexual selection and human kinship systems. The essay contains many interesting suggestions, but suffers from the fact that the author is obsessed by a single idea. He believes that the human neocortex, the human conscience and sense of guilt, and human kinship systems and incest taboos, owe their existence to sexual selection operating between males in a society in which only dominant males get mates. Like most obsessions, this is part of the truth; if it were the whole truth, it would explain why only man, and not dogs or baboons, invented Christianity. I am also curious to know how Miss Greer will react to the suggestions that women owe their intelligence to selection between males for dominance.

The book ends with a useful summary by Caspari of what has gone before. In an apparent attempt to redress the balance between the sexes, he ascribes my work on group and kin selection to my wife. To conclude, this volume is the most informative and stimulating discussion of sexual selection at present available.

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Free Radicals

Free Radicals. Volume 1. Edited by Jay K. Kochi. (Reactive Intermediates in Organic Chemistry.) Pp. xvii+712. (Wiley-Interscience: New York and London, April 1973.) £18.75.

SCIENTIFIC progress depends almost as much on the formulation and critical examination of theories as on the discovery of new facts. Theories cannot be computerized and, since the present