

a coherent tradition of inquiry in areas too abstract and complex for easy intelligibility, but lucid writing, with a minimum of esoteric terminology, comes close to eliminating the difficulties involved.

The central issue is how social scientists should formulate a general strategy for understanding and explaining human beliefs and actions. Such a strategy, it is agreed, must take account of the subjective, meaning which distinguishes "action" from "behaviour". Compare a human being seeking money with a rat seeking food. The desire for money becomes intelligible only through its meaning—its subjective significance in a wide range of social relationships. So for beliefs and actions in general; they can be understood only contextually, as elements in meaningful systems; particular beliefs are intelligible only in so far as the total context of belief is intelligible.

This raises important problems concerning the degree to which mutual understanding is possible between any set of actors. It is in the work of social anthropologists, however, that these problems emerge with particular clarity, and the understanding of alien cultures consequently provides the principal subject of discussion here. How can we know when the meaning of an alien utterance has been captured in our own language? To what extent can the properties of alien belief systems be assumed to resemble our own? And what is to be made of beliefs which seem to us self-evidently false, contradictory or otherwise irrational?

With respect to this last question, two basic positions can be identified. One accepts the existence of "irrationality" and seeks to account for it as such: it is the product of bias, or of a mistaken world view, or illogicality: it persists in a culture because social norms discourage rational criticism, or because scientific method is not available to refute it. The other holds that seeming irrationality can become intelligible if its relationship to its context is more closely scrutinized: if beliefs are given significance only in relation to those actions with which they are concretely associated, their "irrationality" may disappear or become irrelevant: if contextual evidence can make a metaphorical or symbolic interpretation of beliefs plausible then, again, all is well.

The intensity of this conflict unfortunately obscures the fact that the two positions are not mutually exclusive. Irrational or false beliefs, as here defined, are endemic in all societies, and it is hard to apply symbolic explanations everywhere (consider, for example, the "irrationality" which these authors painstakingly demonstrate in each other's work). On the other hand, to interpret

the Nuer belief that human twins are birds as symbolism is at least more promising than to treat it as a curious empirical error. Moreover, it is not difficult to combine the approaches: given that there are many ways of being "irrational", symbolism can help to explain why particular examples occur in particular contexts.

Both approaches assume that "irrational" beliefs need different explanatory treatment to "rational" ones, and hence that it is, in principle, possible to distinguish the two by external objective standards. But, in spite of its title, the book does not give this topic detailed consideration; "irrationality" is usually the starting point for analysis, not its product. Crude models of rationality, usually drawn from the philosophy of science, serve as a sketchy backdrop to the problems already discussed. Empiricism lies behind puzzlement at the incidence of false beliefs. Popper's philosophy is linked with interest in why alien actors hold beliefs uncritically. (Unfortunately, P. Winch relates his "all is rational" view of alien belief systems not to T. S. Kuhn but to their common precursor Wittgenstein, thus spoiling the pattern!)

What does emerge is that if objective criteria of rationality exist there is at present no hope of a consensus on what they are. It could in any case be argued, against the dominant approach in this volume, that such criteria are of little interest to the practical investigator. If he must account for the existence of "false" beliefs, he must do no less for "true" ones; if dogmatic adherence to beliefs is problematic, so too is open-mindedness and provisional commitment. Much of the discussion in this volume could be reformulated to apply to the aetiology and ecology of all beliefs, and merely loses perspective by being confined to the analysis of "irrational" residues. Robin Horton's admirable comparison of African traditional thought with that of Western natural science demonstrates the value of widening the scope of the debate, treating our own beliefs with genuine curiosity.

I would agree that any paradigm of rationality must be broadly compatible with the procedures of the natural sciences. Given the rich variety of scientific thought, however, and the way it consistently eludes any single formal description, I am led to adopt what Gellner would call a "charitable" view of alien belief systems, based on the weakest possible rationality criteria. Those who would use stronger or more objective ones should consider, among other things, how much of modern science they would thereby define as irrational. This position comes closest to that of Winch, who nevertheless misuses his own arguments. By treating all belief systems as

rational, he does not show that beliefs are immune to causal explanation, but that the same forms of causal analysis can be universally applied to all beliefs—something not yet fully recognized, at least within the social sciences.

S. B. BARNES

## Natural Selection

*Coefficients of Natural Selection.* By L. M. Cook. (Biological Sciences.) Pp. 207. (Hutchinson University Library: London, February 1971.) £2.50 boards; £1.25 paper.

THE problem of explaining mathematical arguments to biologists has driven many a promising teacher to despair. The biological undergraduate, and occasionally even the graduate, is prone to go into shock when faced with an algebraic equation as complex as

$$a = \frac{bc}{d}$$

Nowhere is the problem more acute than in population genetics, where the underlying arguments are largely mathematical but the observations and experiments are firmly based in natural history. Dr Cook has attempted the dreadful task of bridging the chasm between them, and he has largely succeeded.

His book is neither a text for undergraduates, although there are many who would benefit from it, nor an account of methods in research. It is a stimulating, original and idiosyncratic essay about the genetic analysis of natural and experimental populations. He leads his readers gently through the complexities of selection differentials, the calculation of equilibria, and the analysis of selective forces depending on gene-frequency and population density. At times, understandably, he falls into the trap of rendering an argument more obscure by explaining it too much. Less often, but more seriously, the reader may be led astray by misprints (as on pages 29, 43 and 44) or other errors (as on pages 59, 142 and 160). There are some surprising gaps. For example, he chooses to discuss the phenomena of non-random mating without mentioning the work of Ehrman or Spiess.

These are matters, however, that can be remedied if, as devoutly we may wish, the book reaches a second edition. Its virtues far outweigh its vices. An example of these virtues, to a statistically naive reviewer, is a uniquely lucid exposition of the method of maximum likelihood.

I believe that the value of the book will prove to be inversely proportional to the mathematical ability of the reader. It should be welcomed by biologists and neglected by mathematicians.

BRYAN CLARKE