

## RESPONSES OF INVERTEBRATES

An Introduction to the Behaviour of Invertebrates

By Dr. J. D. Carthy. Pp. xi+380+4 plates. (London: George Allen and Unwin, Ltd., 1958.) 45s. net.

HERE is a useful summary of a large volume of literature on some responses of invertebrates to experimental stimulation. It is not, therefore, a textbook of behaviour, which is a larger subject including spontaneous activities, memory and central control mechanisms. There are chapters on the responses to stimulation in each of the main sensory modalities, including humidity changes and the contact chemical sense, in addition to those more familiar from our own experience. The final chapter, on whole patterns of behaviour, is disappointing, since the behaviourist approach and that of the neurologist are both excluded, leaving an account of the reactions to combined stimuli.

The coverage is excellent. The recent literature is summarized together with the old, but in some instances the necessary re-interpretations are not forthcoming. First, for example, in this decade a number of workers have shown that the angle of light acceptance of an ommatidium is wide compared with the interommatidial angle. Much of the earlier work on visual acuity and form vision by the apposition compound eye must now be attributed to post-retinal mechanisms. For a longer period it has been known that the principal physiological responses of many eyes change with time, and, in particular, some rapidly moving diurnal insects have little but an 'on' and an 'off' response. Form vision must then depend on relative movement of the eye and the object, and again must be attributed to post-retinal integration. Hassenstein's analysis of the *Wechselfolge* of *Chlorophanus* is an example of the new approach to this mechanism. Secondly, a most important theory of the relation between spontaneous movements and the responses to stimuli is that of von Holst; this is barely mentioned under the name re-afferentation, but not explained. Recent results from the Tübingen school demonstrate the explanatory value of these concepts in this field, and they deserve a better treatment.

In my own special field the literature summary is accurate, a judgment which can probably be extended to the remainder. The difficulty is not the labour of being acquainted with the material; it is the comprehension of its relation to the main body of knowledge. The solution of this problem distinguishes a synthesis from a compilation.

However, this is mild criticism. The book represents the painstaking and useful labour of summarizing a vast, diffuse and unsatisfactory field of zoology. The responses of whole animals to the somewhat artificial circumstances required by experimental analysis are notoriously difficult to interpret. Often a particular species is studied by only one author, so that comparisons are difficult and may not be valid. The experiments must often be made statistically with a large number of animals so that the mechanism within an individual is not easily approachable. This brings me to the final point. The introduction of delicate electrophysiological methods for the analysis of the actual performance of sense organs as transducers has led to a quiet revolution in our appreciation of the various parameters of a stimulus which can possibly be of importance to the animal. The problem of the origin of the integrated response is thereby

usually pushed back into the central nervous system, but at least an advance is made. Neither this book, nor its predecessors, claims to synthesize this more recent neurophysiological analytical approach with the 'behaviour' of the whole animals. Perhaps the effort is doomed to frustration for a long time to come.

G. A. HORRIDGE

## FACT AND VALUE IN THE SOCIAL SCIENCES

Value in Social Theory

A Selection of Essays on Methodology. By Gunnar Myrdal. (International Library of Sociology and Social Reconstruction.) Pp. xlvi+269. (London: Routledge and Kegan Paul, Ltd., 1958.) 32s. net.

IN this book, Dr. Myrdal faces a simple but at the same time unsolved problem which has overshadowed the social sciences since their inception, namely, the relation between statements of fact and statements of value. As an economist, he found himself in his earlier days compelled to reject the solution of the "welfare economists"; in later years he was equally repelled by the "naïve empiricism" of the American institutional school, with the result that the value problem has come to be a "major preoccupation" for him, and questions of methodology have been for many years one of his continuing interests.

Dr. Myrdal's position at the present time is directly dependent on an acceptance and development of the view that 'objective' values cannot be established and known by scientific processes; subjective evaluations can be observed and analysed, but their validity and their significance for social theory only arise out of their acceptance by specific individuals and groups. In consequence, when Dr. Myrdal produced his great survey of race relations in the United States, "The American Dilemma", he made his value premises explicit, and based them so far as possible on observation. He made no attempt to argue that they could be incorporated in a body of fact and doctrine created by the research itself. He now concludes in the present book that valuations are necessary in all scientific work, and that "the final solution of the value problem in economic and in the social sciences generally must . . . be to set up a method by which human valuations are rationally and openly introduced into theoretical and practical research to give it direction and purpose to make it both unbiased and relevant to life". No research can, therefore, be *wertfrei*.

This is the point at which Dr. Myrdal leaves the argument in his "Postscript". It may be pointed out, however, that it is somewhat paradoxical to speak of the 'introduction' of values into research in this way because the very nature of science as a human activity is dependent on the logical presupposition that it should be unbiased. Moreover, as Mr. Streeten points out in the introduction to Dr. Myrdal's essays, the analysis and public discussion of beliefs and valuations tend to produce changes in them, and scientific inquiry thus plays its part in their formation. There is thus a connexion between fact and value, to this extent at least. If, however, it must be concluded that the social sciences cannot be 'objective' in Max Weber's sense because the connexion is not a logical one, there is nevertheless a limited area within which their explanation of man's behaviour is scienti-