

trated by the experiences of the participants in a number of fields.

The discussion of polysaccharides and viruses was led by Frank L. Horsfall, who was allowed to make at least a page and a half of contribution before he was interrupted by his fellows. It did emerge that the twenty or more viruses react in one way or another with erythrocytes. Many of them can cause hæmagglutination, a phenomenon which can be inhibited specifically by complex polysaccharides of the muco-protein class. Powerful inhibitors of viral hæmagglutination may be found in urine, egg-white, serum, and so on. The animal viruses may be divided into three groups: those which contain particles which react with the red cells, are absorbed, and then emerge again; others which contain components which react and are absorbed by the red cell but cannot be released; and the third group which does not attach itself to a red cell but produces a soluble substance that does attack the cell.

The discussions on the implications of these new interactions of polysaccharides and viruses components are intensely interesting. The discussion on pyrogens was led by Dr. O. Westphal, of the Wander Research Institute, Freiburg, Germany. Pyrogens are substances which, after injection in higher animals, promote a rise in body temperature. Among these are many polysaccharides, particularly those which are elaborated by bacteria. The problem of pyrogen production is, of course, of the greatest importance in medical treatment. Those discussed were of the lipo-polysaccharide-protein complex type. In this discussion masses of observations by the different participants were described and in one way or another almost all the constituents of Gram-negative bacteria have been brought in. The nature of the properdin system and its reaction with polysaccharides were well discussed and comparisons were made between properdin and antibody. In some cases these are well described in tables and diagrams, but they are very difficult to sort out in regard to their relative importance.

Excellent references are given, and to the expert, the whole of this discussion will be of the greatest value and interest. However, to make the book of wider appeal and the discussions of greater value in the future, it is to be hoped that the editor will make a critical assessment of those positive results which have emerged from discussion.

M. STACEY

POPULATION ECOLOGY

Animal Ecology To-Day

By Prof. F. S. Bodenheimer. (Monographiae Biologicae, Vol. 6.) Pp. 276. (Den Haag: Uitgeverij Dr. W. Junk, 1958.) n.p.

Cold Spring Harbor Symposia on Quantitative Biology

Vol. XXII: Population Studies—Animal Ecology and Demography. Pp. xiv+437. (Cold Spring Harbor, L.I.: Long Island Biological Association, 1957.) 8 dollars.

BODENHEIMER'S "Problems of Animal Ecology" (1938) has for some time been out of print. Although broader in scope, "Animal Ecology To-Day" is essentially a revision of the earlier book in the light of twenty years added experience. The central theme remains that "the principal aim of

ecological research is to explore the fluctuation of populations and their (homologous) causes". From this point of view Bodenheimer discusses longevity (Chapter 1), life-history (2), population dynamics (3 and 4), the community (5), environment and heredity (6) in animals, and ends with a brief dissertation on human ecology (7). Many of the illustrations are from works unfamiliar to Western readers. As might be expected in a widely ranging treatise, a few subsections are not quite up to date.

"Animal Ecology To-Day" is truly, as the author says, "not written against anyone or against any theory" quoted or discussed. Nevertheless, it is still to a considerable extent a fairly strong testament of Bodenheimer's personal views. Naturally, he has changed some of the latter since 1938; for example, on the question of weather in population dynamics. At the same time, he is sometimes penetratingly critical of opposing views, as when he points out that parasites can be wrongly credited with controlling increase of their hosts (Fig. 17). This is not a book for beginners. It should be regarded as a thought-provoking supplement to text-books such as those of Allee *et al.* and Andrewartha and Birch. The mature ecologist will find much with which to agree and much with which to disagree. Where acceptable it is sometimes illuminating, and where unacceptable it is occasionally stimulating. Theorists, and those who do not readily distinguish between theory and fact, should profit by reading pp. 190-201.

For up-to-date comprehensive surveys, biologists the world over owe much to the organizers of the carefully edited and beautifully produced "Cold Spring Harbor Symposia". Vol. 22, on population studies, puts them still further in debt. No serious worker on population problems can afford to be without access to it. Containing thirty-six papers (with useful discussions of twenty-four), it is devoted about equally to human and animal populations. Many of the authors are well-known authorities in their subjects and about one-third are from outside the North American continent. Representation is well balanced with respect to controversial matters; for example, the question of natural control of animal populations. Beginning with a very capable introductory survey (containing, as seems to be inevitable, its author's own views at some length), the volume effectively covers most of the important aspects of population study—historical, theoretical, laboratory and field. One is still waiting, however, for geneticists to direct their attention from evolution to regulation of populations. Like all symposia (cp. "The Numbers of Man and Animals"), this volume has disjointed and ill-assorted features. One therefore admires the realism of the author of the "Conclusion", who soon abandons all pretence of summing up the proceedings and devotes most of his paper to expounding a particular view of his own. After all, no one could be expected to sum up proceedings on two subjects so different (despite some basic similarities) as human and animal populations, and including papers on aspects as diverse as "Farris' Formula for predicting Fertile Days" in women and "Roosting Habits, Sexual Dominance and Survival in the Great Tit". Future symposia should be on either human or animal populations, but not on both.

In animal ecology to-day there is less need for new books than for an international committee to define and standardize terms and concepts. Perusal of these two volumes makes this abundantly clear.

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