terms of the fact that his theory is in the early stages of formulation and hence does not lead to very precise predictions that recognize all relevant variables. In such cases negative results do not necessarily demonstrate the inadequacy of a theory so much as they provide a basis for its development. Thus, it is unfortunate that the contributors do not make more use of their negative results.

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Behavior and Ecology

The Exploitation of Natural Animal Populations. A symposium of the British Ecological Society (March 1960). E. D. Le Cren and M. W. Holdgate, Eds. Wiley, New York, 1962. xiv + 399 pp. Illus. $10.75.

Animal Dispersion in Relation to Social Behaviour. V. C. Wynne-Edwards. Oliver and Boyd, London, 1962. xi + 653 pp. Illus. Plates. 55s.

Like most symposia, this one, which has for its general theme man as predator, makes available a valuable but heterogeneous assemblage of research. It would be a mistake to relegate the role of these papers solely to the applied. Unquestionably a major reason why this subject was chosen is that its implications transcend both the organisms involved and the immediate problem of getting the most for the least. As was true earlier in demography, where life insurance predated its probabilistic theory, practice and malpractice in this area of ecology have greatly stimulated fundamental work. The symposium as a whole is praiseworthy for clearly revealing the theoretical framework that is the common characteristic of most of the individual contributions.

The majority of the chapters are concerned with economically important fishes and marine mammals. Additional papers on shellfish, game birds, and mammals and more strictly theoretical contributions to the theory of maximum sustained yield complete the intended range of the symposium. One is tempted to complain that other populations subject to predation—for example, forest trees and pest insects—might have been included. It is hard to say whether the gain derived would have made up for the increased centrifugal forces that might well have destroyed the symposium's functional unity.

Despite gaps, the book serves as a succinct summary of the progress made in empirical knowledge and theory during the period since World War II. It also indicates the multitude of economic, political, and biological difficulties that attend sustained-yield *régimes*. Primary stress is on the biological, and sampling problems emerge consistently as limiting factors to more rapid advance. For many of the most intensively studied food fishes, important premises have inadequate support because no means exist for procuring the required data; in other cases, methodology suffers simply from lack of sustained interest or from lack of funds. The edited informal discussions serve to emphasize the problems and add to the interest of the work.

One of the premises that underlies much of the work on optimum yield, and for which good evidence exists in several cases, is the capacity of populations to regulate their numbers in accordance with population density. In *Animal Dispersion in Relation to Social Behaviour* Wynne-Edwards propounds a closely related thesis that gains novelty by the breadth of its outlook. According to his view, animals in nature themselves practice an effective, maximum, sustained-yield program by substituting social competition for the more destructive, direct competition for food. Most of social behavior is thus regarded as an inventory of conventions evolved by group selection for the regulation of numbers. He postulates that such diverse phenomena as caste formation and sexual dimorphism, territoriality and peck order, the vertical migration of plankton, the swarming of locusts and palolo worms, synchronized crepuscular and auroral bird song, and the many other forms of social display have arisen in this way and serve this function. The author, in a manner reminiscent of Darwin's, documents his thesis copiously. Its very generality makes his thesis attractive, and it may be expected to reorient some of the research in social behavior. Since much of his thesis is difficult to subject to crucial testing, however, it may, if adopted uncritically, have the negative effect of keeping us from asking other pertinent questions. My personal reaction is that the author has overstated his case: the niceties of the social adaptations often cause one to expect to find a better degree of population regulation than in fact exists.

Quite aside from the major thesis that pervades his book, Wynne-Edwards also provides an excellent and unhackneyed review of social behavior, and the book is worth study on this account alone. It is unfortunate that the dual function of this work causes some awkwardness in organization and results in repetition and numerous cross references to details. Unexpectedly, the two themes detract from each other to an extent. But, even though the organization of the material is not completely successful, the book is nonetheless important. It is certainly required reading for any ecologist who puzzles about the relationships between behavior and ecology.

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Chemical Cytology

The Organization of Cellular Activity. C. M. A. Kuyper. Elsevier, New York, 1962. x + 272 pp. Illus. $7.

The author of this short volume has attempted "to give a synthesis of morphological and biochemical data in so far as they relate to the functioning of cells." Chapters are included on the production and storage of energy, membranes, synthetic activity, mechanical activity, heredity, specificity and diversity, and regulation. In each area, the author presents a short résumé of pertinent biochemical reactions and mechanisms and then discusses, where possible, the correlated morphological structures within the cell. There are numerous illustrations, both halftones and line drawings. Although many topics are touched upon, few are developed extensively, and the result is a rather disconnected, staccato presentation of the material. In several places Kuyper expands private views without adequately covering general thought and experiments in the field. This is particularly true of the sections that deal with the structure, coding, and reduplication of DNA. For instance, in discussing DNA and chromosome replication, he does not describe the experiments of Meselson and Stahl or those of Herbert Taylor.

There are very many factual errors