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

and misleading statements throughout the text (for example, "The most modern development of the polarization microscope is the interference microscope"; "Its [DNA] metabolism is not very well known"; ". . . all grain counts made with tritium as a label are suspect, and so are all theories founded on these counts"). The specialist can overlook these deficiencies, or read between the lines where necessary, but for the beginning student or general reader who wants a brief review of the rapidly moving field of chemical cytology, Kuyper's book is not very satisfactory.

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Basic Medical Science

A History of American Pathology. Esmond R. Long. Thomas, Springfield, Ill., 1962. 474 pp. Illus. $12.50.

This is an important book—as important to American medicine as a whole as it is to American pathology. The author has succeeded in producing an extraordinarily readable and informative book that should be required reading for everyone interested in the past, present, or future of medicine in America.

The work is divided first with respect to time, beginning with the 16th and 17th centuries and continuing to the present day; it is then subdivided with respect to space (with attention to geographic considerations), specialities, general and special pathology, societies and journals, the effects of the greatly increased support of medical research, in which pathology has shared, and current trends in the practice of pathology as a profession.

American pathology divides itself naturally into two periods: pre- and post-Welch. This is noted in stating: "So began, in 1886, the history of the Pathological Department at Johns Hopkins University, which was to revolutionize not only the teaching of pathology in this country, but in large measure that of every branch of medicine as well." It is further noted that: "After the middle of the century the trend in American visiting was toward central Europe, and, whatever the terminal objective, whether medicine or surgery or a specialty like ophthalmology, it was recognized as sound common sense to acquire a good background in pathology," which was mainly pathological anatomy.

This continued for many decades thereafter; there was, in fact, no other course open to anyone who aspired to a knowledge of the fundamentals of medicine, in preparation for any branch of clinical medicine; not until the first quarter of this century did medicine, surgery, and the specialties themselves begin to offer alternate pathways. In a brief section entitled "Current trends in pathology," the author calls attention to "the apparent conflict between the old time traditional pathological anatomy and experimental pathology, on the one hand, and clinical pathology as a hospital service function on the other." This conflict he regards as more apparent than real, and he concludes that "it appears clear that pathology, wherever its teaching and research are principally conducted, will be coordinated more closely than has ever been the case before not only with clinical medicine but with the basic sciences in biology, and with physics, chemistry and mathematics as well."

The book illustrates a difficulty encountered by all writers on the history of medicine, and doubtless by those in other fields as well. Although the author is able to treat the early history of American pathology at a leisurely pace and to give as much as several pages to the contributions of a single worker, the tempo is stepped up as the modern period is approached, and as more and more names and topics clamor for attention. That this leads to longer and longer sentences and to fewer words per person and per topic, to the extent that the book comes to resemble a compendium, is not peculiar to this work; it reflects the rapidity with which medicine has grown to a point at which it has become almost unmanageable.

The author states that: "The history, while stressing the growth of ideas, is devoted in large measure to a record of the men and women who made contributions of significance. The number of these is large, and inevitably, the account of each is condensed." Perhaps the only answer is greater selectivity, such as is apparent in the choice of 55 photographs of leaders in pathology for reproduction. Many names could have been omitted, especially of those who are still living and whose position in the history of American pathology is not yet secure.

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Russian Résumé

Plasticity of Crystals. K. V. Klassen-Neklyudova, Ed. Translated from the Russian. Consultants Bureau, New York, 1962. 196 pp. Illus. $12.50.

This "Authorized translation from the Russian" of an integrated "collection" of papers written during 1957 and 1958 by the Laboratory of the Mechanical Properties of Crystals (Institute of Crystallography, Academy of Science of the U.S.S.R.), is printed on unsized paper from typescript, with an unjustified right margin.

The book represents a résumé, written especially for Russian scientists, of the present status of our knowledge of the plastic deformation of crystals. There are six chapters: "Physical basis of plasticity and strength of crystals" (7 pages) by M. V. Klassen-Neklyudova; "Time and temperature dependence of plasticity characteristics in monocrystals" (52 pages) by V. R. Regel; "Plastic deformation not inducing asterism in Laue spots" (7 pages) by A. A. Urusovskaya; "Formation of regions with a reoriented lattice as a result of deformation of mono- and polycrystals" (38 pages) by A. A. Urusovskaya; "Description of the simplest phenomena of plastic deformation from the viewpoint of dislocation theory" (42 pages) by V. L. Indenbom; and "Effect of grain disorientation angles on the structure and properties of intercrystalline boundaries" (49 pages) by V. F. Miuskov.

Klassen-Neklyudova's chapter serves as an introduction. He explains that, although the plasticity of crystals was a topic of early interest to Russian scientists, such as Joffe, the popularity of nuclear physics forced crystal plasticity into the background. When dislocation theory directed renewed attention to crystal plasticity, the interest of the Russians was again stimulated, but their progress was held up until standard works could be translated. This book is intended to fill the gap in the Russian literature, which occurred between writing the standard works and their translation; systematic description of the present problems is also attempted. This initial chapter also outlines the other chapters.

Regel is concerned with the behavior of single crystals as a function of time and temperature. The relevant experimental work is brought together, and the general physical theories proposed to explain them are discussed. Although