

Book Reviews

Aggression. John Paul Scott. University of Chicago Press, Chicago, 1958. xi + 149 pp. Illus. \$3.75.

This compact little book provides a good over-all view of what we know, to date, about the biological aspects of mammalian aggression. Scott's many years of behavior research at the Roscoe B. Jackson Memorial Laboratory have given him a sure touch not only in describing the actions of animals but in recognizing the relevant antecedents of even such complex forms of behavior as aggression. Written for the series "The Scientist's Library—Biology and Medicine," this book is technical at the knowledge level of biological and behavioral scientists but reports broad conclusions rather than the interim puzzlements, excitements, or arguments of those who are presently immersed in such research. It is eminently readable—delightfully so in many places—and the author has not hesitated to introduce thoughtful commentary on the social implications of his biological facts. The University of Chicago Press is to be commended for establishing this popular (among scientists) series and congratulated for having got such a skillful recounter to present this—for biology—difficult area of behavioral science.

Scott defines aggression as the act of initiating a fighting attack. He describes the mechanics of the process by which animals learn to attack and to refrain from attacking and shows how the facts fit a starkly Pavlovian theoretical model. To psychologists, this will be the most interesting chapter in the book, for by avoiding the more customary definition of aggression (that given in terms of intent to injure), Scott has been able to conceptualize aggression as a simple operant act. If this procedure leaves something to be desired in the explanation of human aggression, it nonetheless orders well a significant body of observations on the lower mammals.

Successive chapters describe the physiology of aggressive behavior. The physiological chapter provides an updating of older theories (Cannon's emergency and the James-Lange self-perception), with a brief and not-too-technical description of recent research. Scott concludes that aggression must be understood as an externally instigated reaction, depending for its duration and vigor on a complex

feedback mechanism. This rejection of an instinct theory that implies spontaneous internal instigation will doubtless satisfy biologically oriented psychologists; it still bypasses the question of how spontaneous attacks are instigated in the absence of primary stimulus conditions. While the Pavlovian model can probably be expanded to account for such behavior, Scott has made no effort to examine the complexities of human aggression that have led psychoanalytic investigators to posit instinctual sources of some of this behavior.

The book is at its best when it treats of the lower animals—their physiology and the effects of their environments. The casual disregard of extensive areas of research on human aggression, however, leaves the problem of aggression, as such, only half covered. The book points up the apparent dilemma of current comparative psychology over whether to limit consideration of a behavioral problem to its infrahuman manifestations—and thus maximize the importance of this research discipline—or to recognize man as an important object of comparative study—and perhaps make an inquirer wonder why we should *infer* answers to practical human problems from mice, rather than seek the answers by direct investigation of man himself. Scott has chosen to emphasize the lower mammals and has done a good job of it. However, since he has had to display, also, important *species* differences, even among breeds of dogs, one cannot but wonder how applicable his conclusions are for an understanding of human aggression. Perhaps this is to say no more than that Scott did what he set out to do so effectively that one only regrets he did not do twice as much.

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The Chemistry and Biology of Yeasts. A. H. Cook, Ed. Academic Press, New York, 1958. xii + 763 pp. Illus. \$22.

In spite of the great progress that has been made in recent years on the whole frontier of yeast research, it is probably correct to say, as Winge and Roberts maintain in their excellent chapter,

"Life history and cytology of yeasts," that of all organisms yet investigated, none have caused more disagreement among cytologists than yeasts. Although the action of yeast has been known and used by man since time immemorial and the yeast organism was observed by Leeuwenhoek as far back as 1680, we must admit that the deeper we penetrate into the secrets of this organism that plays such an important role in human life, the more we become aware of great areas of physiological and biochemical realities that need further elucidation.

Yeast research is presently a focal point of scientific activity, cutting across biophysics, biochemistry, ecology, cytology, genetics, technology, nutrition, physiology, and pathology; the subject can no longer be treated exhaustively and authoritatively by one single specialist but requires the cooperation of numerous scientists, each an expert in his area of research, for presentation of a comprehensive and systematic and yet not too unwieldy assessment of the present status of this very broad, and yet inadequately explored, field of knowledge, still in continuous flux.

The great and difficult task of coordinating numerous contributions from all frontiers of yeast research has been admirably accomplished by the editor, who is himself an eminent authority in yeast research. He has presented here the first comprehensive work to encompass in one volume a vast store of information on all aspects of yeast research.

While the book will be an invaluable reference work in the library of mycologists and biochemists, it should also become an efficient tool in the hands of nutritionists, plant and animal pathologists, and such professional people as bakers, brewers, distillers, and food technologists in general. However, it should also be read by advanced students of cytology, plant physiology, and genetics, whose well-established notions about living matter and life processes will be shaken in their foundations by many facts presented here that should become general knowledge in the field of life sciences. Space permits me to mention only a few outstanding items.

We like to accept it as a basic fact of life that germ cells have half the number of chromosomes of somatic cells. We also know that yeasts reproduce both sexually and asexually and exist in either haploid or diploid phases. However, in contrast to generally accepted laws of reproduction, vegetative growth of yeast can take place in the haploid and diploid phase as well as in a mixture of both, and what formerly were thought to be two distinct genera are actually only two phases of one and the same genus.

Yeasts have definite sexuality, and whether or not sexual reproduction takes

place depends on the presence of cultures of opposite mating type and the action of a chemical substance which induces copulating processes. This substance acts at a distance, and the result of this action could be observed even in a solid nutrient medium between separated colonies of yeast cells of opposite mating type.

No less fascinating than the chapter on cytology is that on "Yeast genetics," written by the same authors. The rapid vegetative growth of yeast in cultures and the possibility of isolating single cells or spores with the help of micro-manipulators and of carrying out artificial hybridization experiments offer the geneticist many advantages he cannot find in other organisms. Thus it is understandable that, from a genetic point of view, yeast is one of the most thoroughly investigated of microorganisms. We know a large number of individual genes of which those inducing chemical specificity of action are of great theoretical and practical importance; on the basis of linkage of these genes, chromosome maps have been constructed; and the existence of inbreeding degeneration, hybrid vigor, and mutations have been demonstrated. But the most interesting and presently most active field of research is that of cytoplasmic inheritance, whose far-reaching implications in biological theory and even in medicine, especially in cancer research, have not yet been fully realized.

The "Aspects of chemical composition of yeasts" are expertly covered by A. A. Eddy, while "Yeast growth" is ably dealt with by E. O. Morris from both the chemical and physiological point of view. Until recently it has been a common assumption that yeasts are unable to assimilate atmospheric nitrogen, but now we have conclusive evidence that certain strains of *Rhodotorula* and at least one strain of *Saccharomyces*, when grown in a nitrogen-free medium but in an atmosphere containing isotopic nitrogen, are able to convert the latter into organic compounds of their cell substance. However, if these facts are considered only as of "mainly academic interest," as the author indicates, a vigorous objection seems to be in order. In a world so short of protein and with yeast promising to play an ever-increasing part in protein supply for human beings and animals, the fact that certain yeast strains should be able to "fix" nitrogen from the air appears to be not only of great theoretical but of even greater practical significance. There is no reason why scientists should not be able to discover, or by way of induced mutations be able to "breed," organisms that will have a much greater nitrogen-fixing ability than those presently under consideration.

Very readable and illuminating are

the contributions on "Fermentation and respiration," by F. F. Nord and S. Weiss; on "Synthesis and degradation of carbohydrates," by W. E. Trevelyan; on "Nitrogen metabolism," by G. Harris; on "Yeast technology," by Magnus Pyke; on "Pathogenic yeasts," by C. G. Ainsworth; on "Food spoilage," by M. Ingram; and on "Flocculation," by H. E. Jansen.

In summarizing I must say that this work, to which scientists from England, Holland, Denmark, and the United States have made such eminent contributions, is a model of international scientific cooperation and, thanks to the painstaking efforts of its editor, also of conciseness and unity of presentation. In both text and appearance it does honor to the publisher; it should be recommended as a first-class scientific standard work to all who take a practical and theoretical interest in the agent of man's oldest industry—fermentation.

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The Effects of Atomic Radiation on Oceanography and Fisheries. Report of the Committee on Effects of Atomic Radiation on Oceanography and Fisheries of the National Academy of Sciences, Study of the Biological Effects of Atomic Radiation. Publication No. 551. National Academy of Sciences-National Research Council, Washington, D.C., 1957. vii + 137 pp. \$2.

The material presented in this volume is much wider in scope and interest than the title suggests. This comment should not be taken as meaning that the members of the Academy committee have evaded the issue presented to them. The issue of the biological effects of radiation is one that confronts all persons and governments, and the seeming absence of authoritative information makes for the prevalence of contradictory opinions. While the gaps in knowledge are freely indicated in this report, the careful collation of relevant information enables the reader to learn that considerable and careful attention has been given to the problems which the use of atomic phenomena raises.

In addition to an introduction on the importance of the ocean as a receptacle for radioactive materials, there are 13 chapters, dealing with properties of atomic wastes, natural radiations received by organisms, disposal and dispersal of radioactive elements, effects of ecological relationships on transport and dispersal, effects of radiation on aquatic organisms, and isotopic techniques in chemical and physical oceanography. Although each chapter is self-contained, there is

extremely little repetition, and the freshness in approach provides much stimulus to scientific thought. Despite the bias of the title towards the effects of atomic radiation, many fundamental fisheries and oceanographical problems are brought forward and receive illuminating attention.

The most serious type of hazard likely to arise from the addition of radioactive wastes to the sea is that following the concentration of wastes by organisms used as human food. The increasing use of the sea as a source of food for the rapidly expanding world population enhances the value of knowledge on this matter. As both the qualitative and quantitative natures of food chains differ in the various parts of the world, local studies are necessary. The information arising from such studies is indispensable to programs of proper fisheries management, and this interrelationship once more emphasizes the importance to fisheries science of a close synthesis with oceanographical knowledge. Similarly, the problems of radioactive disposal demand from oceanography a knowledge of currents, wind effects, sedimentation processes, and so forth—all matters of theoretical and applied importance in their own right but matters which ask for more urgent attention in the stress of the present age.

These questions and many others are critically considered throughout the report, and ingenious methods are suggested for their study. The collection of these stimulating and authoritative articles together in one volume is especially to be commended, as such reports are often buried in special publications issued in temporary form. It is hoped that the statement in the foreword that the study is a continuing one means that further volumes will appear.

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Colorimetric Determination of Non-metals. David F. Boltz, Ed. Interscience, New York, 1958. xii + 372 pp. Illus. \$8.50.

This book is volume VIII of a series of monographs on chemical analysis. As such, it complements volume III, Sandell's *Colorimetric Determination of Traces of Metals*.

Under the editorship of David F. Boltz, 14 authors, including Boltz, have cooperated in writing the 11 chapters. The first of these chapters covers briefly the principles and practices of colorimetric and related photometric methods. The other ten cover methods believed to