of fact and interpretation in early work have obviously been caught and eliminated at various stages prior to publication of the finished volume, so that it presents a considerable unanimity of opinon. This is not to say that other errors may not be revealed by later researches.

Approximately half of the papers may be classed as physical or nuclear-chemical in content, and half as chemical. Some three-quarters of the papers deal with plutonium, about one-sixth with neptunium, and only a few with americium and curium. Partly because of the comparative nature of some studies, papers dealing with the rare earths, radium, actinium, thorium, protactinium, and uranium are also found. Aside from the large body of data on the synthetic elements, the greatest contributions of the volume to other fields of science are techniques and instruments developed for nuclear-chemical studies, particularly with alpha emitters, and the demonstration of the possibilities for ingenious applications of microtechniques to problems in inorganic chemistry. The book also has a pedagogic value for research students, in demonstrating the applications of textbook material to actual laboratory problems, and the methods used to obtain scientific data in new situations.

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Traité de Zoologie: Anatomie, Systématique, Biologie: Oiseaux, Vol. XV. Pierre-P. Grassé, ed. Paris VI^{e}, France: Masson et Cie, 1950. 1164 pp. 6000 fr.

With the appearance of this thick volume all students of avian biology are aided in their work by a comprehensive treatise that is literally packed with useful information, well presented and amply illustrated, and accompanied by well-selected lists of references to the literature. Unlike the similarly comprehensive volume written by Stresemann some years ago, the present work is the product of a group of authors. The advantage of a group of specialists' pooling their information is often offset by a resulting lack of uniformity in approach and presentation, but the editor of this volume has overcome the lack to a remarkable degree, and the volume is free from the literary jerks and mental changes of focus usually found in such composite treatises.

N. Mayaud contributed six chapters, on skin and plumage, biology of reproduction, food, longevity, voice and nonvocal sounds, and behavior and social life; A. Portmann eight chapters, on skeleton, nervous system, sense organs, circulatory system, respiratory system, digestive tract, body temperature and warm-bloodedness, and postembryonic development; E. OEhmichen three chapters, on musculature, flight, and terrestrial locomotion, swimming, and diving; P.-P. Grassé two chapters, on the uropygial gland and the organization of social life; A. Rochon-Duvigneaud a single chapter, on eyes and vision; J. Benoir three chapters, on endocrine glands, urogenital system, reproduction-sexual characters and hormones in relation to the seasonal sexual cycle; R. Matthey one chapter, on chromosomes of birds; J. Pasteels one chapter, on embryonic development; F. Bourlière two chapters, on ecological factors and adjustments, and physiology of migration; J. Piveteau one chapter, on the origin and evolution of birds; J. Berlioz three chapters, on the systematic description of the subclasses, orders, and families of birds, geographic distribution, and general aspects and origin of migration; and E. Letard the final chapter, on domestic birds' origin.

The contents of the book are made readily accessible by a good index and a detailed table of contents. The illustrations and the text are well printed but the type of paper used is not uniform throughout the book. The volume should be of great use and value to workers in many and diverse fields that utilize avian materials in their studies, and deserves a wide distribution among scientific libraries.

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Survey of Biological Progress, Vol. 1. George S. Avery, Jr., ed. New York: Academic Press, 1949. 396 pp. $6.80.

This stimulating volume is the first *Survey of Biological Progress,* and is the result of an undertaking which its editors hope will be repeated annually. In the words of its editor-in-chief, it is designed to provide "a medium for integrated presentation of facts and thoughts from all fields of biology," "to offset in a certain measure the isolating effect of rapidly increasing specialization" and "to serve the biologist who wishes to be well-informed in fields marginal to or beyond his own special sphere of interests—fields he would have neither the time nor opportunity to follow systematically in the original literature." The editorial staff and the advisory board, along with the twelve authors and the institutions they represent, are indicative of the high standards of the articles included in the *Survey* and the dependability of its contents.

The volume includes eleven chapters, the first of which is a discussion by Harriet B. Creighton on "Teaching Biology Today"—a brilliant and challenging presentation of the general goals in teaching an introductory course in biological science. The remaining chapters are devoted to recent developments in a large area of biology, in some instances of fundamental sciences and in others of applied sciences.

Many chapters emphasize the influence of findings in one field on the interpretations of known facts in allied fields. The outstanding importance of cancer research and the aspects of cellular physiology to which it is related is indicated by the fact that 42 percent of that part of the volume relating to current research is devoted to a consideration of viruses, enzymes, genes, and antigens and their interrelations as well as their relationships to cancer problems. There are 594 references in the four chapters covering this large segment of the book.

In his stimulating chapter on "Genes and Gene Action," Bentley Glass shows how current researches on the nature of gene action are uniting the "phenomena of classical genetics, cytoplasmic inheritance, cellular differentiation, and enzymatic adaptation." After summarizing Sonneborn's view that "cancer may result

either from the introduction of a virus into the cell or from the mutation of a plasmagene, and that carcinogenic agents either make the cells more sensitive to viruses or induce mutations in plasmagenes,'' he concludes that ''this theory may prove to be as fruitful in increasing our knowledge of the gene and the mechanism of gene action, as in opening up a new approach to the conquest of the second, in present importance, among the causes of human death.'' He further elucidates Spiegelman and Kamen's theory relating gene activity and plasmagenes to the synthesis of enzymes and proteins. His final conclusion is that ''Genes, antigens, enzymes and plasmagenes are being related to one another and may soon disclose how genes produce their effects—and perhaps how cancers arise.''

Donald Paul Costello, in ''Growth and Development,'' emphasizes the strong union which is now being welded between embryology and biochemistry, owing largely to attempts to trace morphogenetic processes back to their biochemical precursors. According to Dr. Costello, the major problem in embryology today is ''the origin of diversity in development,'' and one of the four approaches to this problem he proposes is ''the origin and characteristics of the differential metabolism of the parts with elucidation of the enzyme systems involved.''

In his comprehensive and excellently illustrated chapter on ''Virus Tumors,'' L. M. Black clearly presents recent developments in virus studies in general and virus tumors in particular, from both the plant and the animal standpoint. He urges in conclusion that ''Because of the demonstration of virus etiology in some cancers it seems important that the virus approach to the problem be vigorously prosecuted. Only by strenuous attempts to verify the hypothesis of virus etiology wherever it is indicated (and perhaps also where it is not indicated) can the virus concept make its full contribution to an understanding of tumors and cancer.''

In ''Growth Hormones and Tissue Growth in Plants,'' Philip R. White points out that tissue culture work has demonstrated that the capacity of a tissue to produce growth hormones may become greatly enhanced over that in normal tissues and that ''this altered capacity for hormone production appears to be responsible for the development of certain malignant types of tumors in plants. The mechanisms involved in this enhancement are not fully understood. They present several possibilities, each of which has its counterpart in the theories of the mechanisms of cancer production in animals and man.''

There are two additional chapters on subjects in somewhat related fields. Karl E. Mason, in ''Nutrition and Reproduction,'' emphasizes the importance of vitamins as well as proteins, fats, carbohydrates, and minerals to reproduction in invertebrates, fishes, amphibia, reptiles, and birds, as well as mammals. In ''Hormones and the Differentiation of Sex'' Robert K. Burns presents the problems of the morphological development of sex organs as related to specific sex hormones in amphibia, birds, and mammals. The excellent illustrations are helpful in following complex morphological developments.

A new, challenging, and potentially useful technique is presented by Martin D. Kamen in ''Tracer Methods in Biological Research,'' as he examines ''the status of tracer research, especially with regard to potentialities.'' After giving the bases of tracer methodology he presents applications to biochemical and physiological research.

Karl C. Hamner, in his chapter on the ''Influence of Environmental Factors on the Vitamin Content of Food Plants,'' treats the question of vitamins from the standpoint of the plant scientist concerned with increasing the vitamin content of plants so that they may better serve as a source of nutrition for man and other animals. Similarly, W. A. Frazier, in ''Newer Methods in the Rapid Development of Disease-resistant Vegetables,'' presents the problems connected with developing improved sources of food. Plant breeding, as an applied science of fundamental importance to the welfare of man, requires an extraordinary breadth of knowledge and experience on the part of the men who work on these problems. ''The plant breeder of today,'' he writes, ''may need to give thought to problems ranging from rearing of blowflies and maintenance of weed nurseries to physiologic races of pathogenes, cytogenetics of incompatibilities, techniques of vitamin determinations, on to the genetic and biometric problems surrounding inheritance of such important quantitative characters as yield and fruit size.''

G. E. Hutchinson and E. S. Deevey, Jr., authors of the chapter on ''Ecological Studies on Populations,'' emphasize the importance of cooperation between the naturalist, the taxonomist, the experimentalist, and the mathematician, if a fundamental approach to the science of ecology is to be made. This cooperation is becoming more and more apparent and is a healthy reaction, the authors say, ''from the time when the field naturalist was a rank amateur, the taxonomist a mere stamp collector, the experimentalist out of touch with nature, and the theoretical worker incomprehensible and overspeculative.'' This is the only chapter that even approaches anatomy, taxonomy, and gross morphology—large sectors of the biological sciences which most certainly deserve mention along with the experimental aspects of biology in a *Survey of Biological Progress* if the intended aim as stated in the preface is to be achieved. It is further to be noted that the list of editors does not include outstanding names in any of these fields. There is an ever present danger that funds and publicity may contribute to overdramatization of those areas of science that most easily catch the fancy of the public, and thereby help to produce an unbalance which might eventually reflect itself in editorial policies discriminating against review of the less popular areas of investigation and a resultant disservice to scientific progress generally. Since this is to be an annual publication, the editors will have ample opportunity another year to remedy this omission or to limit their review by some such qualified title as *Survey of Progress in Experimental Biology.*

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