Book Reviews

Chromosome atlas of cultivated plants. C. D. Darlington and E. K. Janaki Ammal. London: Allen and Unwin, 1946. Pp. 397. $2.75.

The major portion of this volume is devoted to a catalogue of the chromosome numbers of some 10,000 species of cultivated plants—a work which should prove of inestimable value to investigators in many fields of the plant sciences. It is the most comprehensive contribution of its kind to have appeared since Gaiser's compilation in 1930 and brings well up to date the results of several hundred investigators throughout the world. By applying the term "cultivated" in a liberal sense the authors have included not only crop plants, drug plants, and ornamentals but also such groups as parasites, carnivorous plants, stocks used for fruit and flowering trees, latex plants, plants used for tools, weapons, etc., as well as those which furnish cork, herbicides, resins, and the like.

The families, genera, and species are arranged in systematic order according to the Bentham and Hooker system, which has the advantage of bringing together groups with related chromosome ratios. Beside each species is given its common name (when it has one), its somatic chromosome count, a reference to the literature, a symbol indicative of the use of the plant, and a statement of its geographic origin.

An introductory section contains a stimulating discussion of the origin of cultivated plants based in part upon the work of Vavilov and in part upon conclusions to which the authors' work has led them. Emphasis is placed on the fact that the center of diversity of many crop plants has shifted and that in many cases there has been not one region of hybridization and selection but several. The "snowball" effect of migration on variety is discussed, and some of the guiding principles of plant breeding, as determined by chromosome behavior, are elucidated.

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Die Methoden der Fermentforschung. (Vols. I–IV.) Eugen Bamann and Karl Myrbäck. New York: Academic Press, 1945. Pp. xx + 3388. (Illustrated.) $65.00.

Until one really digs into this set of volumes he cannot truly appreciate the tremendous task which the authors undertook and accomplished. The only word which can adequately describe the work is "encyclopedic." It is encyclopedic in the sense that it covers every field that in any way pertains to research in enzyme chemistry. One almost feels, while perusing the volumes, that they were written from the viewpoint of making them the only books necessary on the shelf of the enzyme chemist.

These volumes are photo-offset reproductions of the originals, published and distributed by authority of the Alien Property Custodian. The paper and bindings are excellent. The work is essentially European in origin, the various sections (all written by authorities in their respective fields) coming largely from western Europe. A small proportion was written by English authors, with less than 3 per cent emanating from the United States. It is unfortunate for those who might have wished to purchase certain volumes separately not only that the breaks between volumes come at illogical points, but that all of the literature references and indexes are collected together in Volume IV, thus making this volume essential to the value of all of the others.

Volume I begins with a short introduction, in which the definitions, nomenclature, and classification of enzymes are discussed. Approximately 400 pages are then devoted to the chemistry of the substrates, intermediates, and end products of enzyme actions. Each section of this portion discusses the synthesis (where possible), isolation from natural sources, some of the chemical reactions, and, finally, certain of the physical properties of the substances in question. These substances range from glycerides, starch, cellulose, and proteins to nucleic acids, tannins, chlorophyll, acetylcholine, and acceptor dyes. While the chemistry is not as complete as one would find in monographs, it gives a very satisfactory background to the nonspecialist. Six pages, for instance, are devoted to a discussion of the structural chemistry of the proteins.

The next phase of the subject to be taken up is that of methods—largely those of a physicochemical nature. Nearly 60 pages are devoted to a discussion of the use of X-rays in the determination of the structure of organic substances. There follows a series of sections devoted, among other subjects, to absorption spectra, Raman spectra, fluorescence, polarography, dielectric constants, ultracentrifugation, diffusion, sublimation, and the determinations of melting points and molecular weights. These chapters are not in the least superficial. They delve into the underlying physical principles and develop the fundamental mathematical equations where such are germane to the subject.

The second section of Volume I goes into the subject of catalysis and reaction rates, with discussions of all of the various means of measuring the latter, including polarimetry, refractometry, spectroscopy, and the use of the interferometer. Theories of buffers, pH, and redox potentials are developed. These even go into such detail as to describe, with illustrations, how to platinize an electrode. Finally, there is a lengthy discussion of the free energy of reactions, and several sections devoted to the microanalytical procedures used for the quantitative assay of many of the participants in enzyme reactions.

Volume II is devoted largely to the preparation, isolation, and characterization of enzymes and includes sections on the preparation of enzymes from bacteria, algae, yeasts, molds, and protozoa, as well as from more conventional animal and plant materials. The major por-

tion of the volume is devoted to the hydrolases (carbohydrases, nucleases, and amidases). This section continues on into Volume III, without a break, to take up the proteases and "thrombase" (including a discussion of blood coagulation).

Volume III then goes on with the desmolases, including a lengthy discussion of alcoholic fermentation. Following this are found chapters on a wide variety of enzymes which participate in oxidation-reduction reactions, including such typical representatives as the cytochromes, peroxidase, catalase, and hydrogenase.

The latter part of Volume III is devoted to lengthy sections on assimilation in plants and bacteria, antienzymes, model enzymes, the place of enzymes in medical chemistry (including cancer), and finally, a large section on the industrial uses of enzymes. Included in the more than 200 pages devoted to this subject are discussions of such representative topics as the use of enzymes in the baking, fermentation, fat, milk, and pharmaceutical industries.

Volume IV, as mentioned above, is largely made up of a bibliography of over 6,000 references, some of them referring to early 1940 literature. The inclusion of many references under subnumbers, obviously added at a later date, indicates the effort of the authors to make these volumes completely up to date. Included also are complete author and subject indexes and, finally, three pages of corrections.

This set of four volumes represents an extremely valuable addition to the chemical literature. It is essentially a compendium of information, no effort having been made to be critical of the cited literature. To the enzyme chemist, as well as to the general biochemist, it is well worth possession.

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A textbook of bacteriology and immunology. **Joseph M. Dougherty and Anthony J. Lamberti. St. Louis: C. V. Mosby, 1946. Pp. 360. (Illustrated.)**

This small, attractively bound book is described in the Preface as an effort "to simplify the various phases of bacteriology and immunology, for the purpose of securing the interest and enthusiasm of the average student." The guiding philosophy is stated as "the resolution of all difficulties from the viewpoint of the student." Bacteriology and immunology are covered in only 313 pages; a section of 31 pages on parasitic protozoa follows. The text is written in a clear, straightforward style, and there are especially helpful chapters on the microscope, quantitative titrations, and the blood. Otherwise, the book generally follows outlines that are traditional.

Unfortunately, a considerable amount of the limited textual material is given over to technical directions for laboratory work, and still more space is devoted to descriptions of the older rather than of the newer concepts of microbiology. Attention to historical matters, and omission of much relatively new information, is especially noticeable in the chapters on the pathogenic microorganisms and on immunity. For example, no mention is made of active immunization against tetanus. In the immunology section the diagrams showing Ehrlich's side-chain theory, which were so conspicuous a feature of early treatises on immunity, are reproduced. The reviewer had never again expected to see these pictures in a modern textbook or to find the inaccurate ideas prevailing in the infancy of immunology again set forth in detail. At the same time, the basic physicochemical phenomena now recognized as actually responsible for *in vitro* antigen-antibody reactions are not clearly described. The fundamental subject of hypersensitivity is not discussed at all, and although there are separate chapters on filtrable viruses and on rickettsiae, nothing is said about such common virus infections as measles, influenza, or encephalitis, or about endemic (flea-borne) typhus.

The reviewer is in sympathy with the commendable aims of the authors to present a brief text that promotes the cultural values inherent in the study of bacteriology and that simplifies matters so that the average student can easily comprehend them. This book, however, omits so much of the newer, significant knowledge that it leaves the reader with an inadequate understanding of various phases of up-to-date microbiology. Even so, it does succeed in condensing much useful information and doubtless will appeal to undergraduate students, for whom it was designed.

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The Svedberg, 1884–1944. **A. Tiselius and Kai O. Pedersen. (Eds.) Uppsala, Sweden: Almqvist and Wiksells, 1945. Pp. 731.**

This is a contribution to commemorate the 60th birthday of the distinguished Swedish scientist, The Svedberg. There are 55 chapters or papers (mainly in the field of chemistry and chemical engineering) by 70 authors: 37 papers are in English, 11 in German, 5 in Swedish, and 2 in French. Because this volume was projected and prepared during the war years when free communications with colleagues in other lands were difficult, if not impossible, all but two of the authors are Swedes, although Dr. Svedberg's great contributions to chemistry and to chemical industry are known the world over. Some of the chapters give us glimpses of Dr. Svedberg's challenging life and extraordinary labors and achievements. Hardly anything makes Dr. Svedberg as happy as "planting a young seedling and watching it grow."

This volume, published by the aid of 21 Swedish industrial organizations in honor of an outstanding scientist in the field of chemistry and chemical engineering, is a reminder that the size of a country is no measure of the caliber of that country's citizens, be they scientists or statesmen.

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