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 BOOK REVIEWS
 

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**Annual Review of Biochemistry.** Volume 28. J. MURRAY LUCK, Editor, Stanford University, FRANK W. ALLEN, Associate Editor, University of California, and GORDON MACKINNEY, Associate Editor, University of California. Annual Reviews, Inc., Grant Avenue, Palo Alto, California, 1959. vii + 698 pp. 16 X 23 cm. Price, \$7.00 (U.S.A.); \$7.50 (elsewhere).

The ever-increasing field of Biochemistry is placing greater demands for review articles but at the same time necessitates the restriction of such reviews if the volumes are not to become too bulky to handle. Review articles are hence for the most part limited in scope and in content. These limitations hold true for the present volume of Annual Review of Biochemistry. This edition however lives up to the quality of the previous books in this series and will serve as a valuable reference book.

The content of this book is as follows: *the chemistry of carbohydrates* (sugar amines, mucopolysaccharides, analytical methods, biosynthesis of cellulose); *lipides* (chromatography of unsaturated fatty acids, characterization and biosynthesis of unsaturated fatty acids, and methods, structure and synthesis of phosphatides); *amino acid and peptide chemistry* (terminal amino acid analysis, peptide synthesis, and amino acids and peptides of natural origin); *structure of proteins* (amino acid analysis, end group analysis, isolation procedures, structure of several proteins); *protein biosynthesis* (amino acid activation, polypeptide formation, site of protein synthesis and role of nucleic acids in protein synthesis); *carbohydrate metabolism* (role of uridine derivatives, glycolysis, fermentation, gluconeogenesis, citric acid cycle, pentose phosphate pathway, amino sugars, photosynthesis, enzymatic and hormone regulation); *amino acid metabolism* (qualitative alteration of proteins in cells, type reactions of amino acids, amino acid oxidation, and metabolism of specific amino acids); *metabolism of steroids* (adrenal steroids, androgens, estrogens, bile acids); *biochemistry of carcinogenesis* (radiation, chemical, viruses); *clinical biochemistry* (diabetes, galactosemia, plasma proteins, lipids, serotonin, epinephrine, urticaria pigmentosa, gout, copper and iron metabolism in disease); *biochemistry of genetic factors* (nature and mode of action, DNA replication, inducible enzymes, arrangement and function); *biosynthesis of nucleic acids, purines, and pyrimidines*; *water-soluble vitamins* (chemistry and metabolism); *nutrition* (essential fatty acids, atherosclerosis, function of fat-soluble vitamins, A, D, E, K); *mineral metabolism*; oxygenases and hydrolyses (aromatic rings, non-enzymatic hydrolysis catalyzed by iron compounds, peroxidase); *metabolism of connective tissue* (mucoids, sugar nucleotides, sialic acid, activation and transfer of sulfate, synthesis of the glycosidic bond); *neurochemistry* (chemistry and structure of nerve tissue with respect to lipids and mucolipids; polysaccharides, metabolism of brain lipids, proteins and carbohydrates); and *biochemistry in the U.S.S.R.*

This volume also contains a provocative prefatory chapter by Terroine on fifty years of union between biochemistry and physiology. Young scientists can profit by the experience of this distinguished man in the field of research, teaching and collective activities.

The book contains a new chapter on neurochemistry but, on the other hand, some major aspects of biochemistry are not included. These latter are the cytochromes, phosphatide biosynthesis and oxidative phosphorylation. Previous reviews have covered these topics and undoubtedly future editions will handle this subject material. It seems to this reviewer that Annual Review of Biochemistry should first of all cover each year the chemistry and metabolism of the carbohydrates, proteins, lipids and nucleic acids and then include other topics as space will allow. Reviews on vitamins, nutrition and clinical biochemistry might better be handled elsewhere. It seems desirable to allow for the best distribution of subject material in review articles.

Summarizing and concluding remarks by the authors of the various chapters are interesting, informative and are to be encouraged. An evaluation of the year's work in each respective field would be valuable. Such remarks can be

helpful to students who use these books in their study and to those who are not very familiar with the field.

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**The Molecular Basis of Evolution.** By CHRISTIAN B. ANFINSEN, National Heart Institute, National Institutes of Health, Bethesda 14, Maryland. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1959. xiii + 228 pp. 15.5 X 23.5 cm. Price, \$7.00.

Not only chemists, but also biologists are still largely unaware of the startling advances which have been made in recent years in the understanding of life processes, for it is not yet widely known that the application of molecular structure to biochemistry and genetics promises today to lead to the solution of some of the classical problems of biology. Three 19th century discoveries form the foundation of the new discipline of *molecular biology*: Mendel's discovery of genes, Miescher's discovery of deoxyribonucleic acid and the Buchners' discovery of cell-free fermentation. The specialized fields of research which these discoveries engendered became spiritually united in the 1940's when the notion gained currency that genes are made up of deoxyribonucleic acid and that they do their work by controlling the synthesis of enzymes. The central problem of molecular biology then came to be phrased in terms of three questions about deoxyribonucleic acid: How does it carry genetic information, how does it reproduce itself, and how does it direct the ordered copolymerization of amino acid building blocks into specific enzyme proteins? Although none of these questions have as yet been answered in a completely decisive manner, a very extensive amount of relevant knowledge already has accumulated, so that certain possibilities at least, have been eliminated from consideration.

The well-known protein chemist C. B. Anfinsen is the first to have attempted an integrated exposition of this knowledge. To be sure, the 1956 McCollum Pratt Symposium entitled "The Chemical Basis of Heredity" is already in print, but this weighty tome, a collection of rather technical papers, makes heavy reading for the uninitiated. Anfinsen, in contrast, covers the same ground in a breezy style, making use of many well-chosen and excellent illustrations. In less than 200 pages he manages to present a very complete and amazingly up-to-date account of molecular biology, missing almost none of the important theories or crucial experiments. The book opens with elementary reviews of evolution and classical genetics and then comes to the point with discussions of nucleic acid chemistry, nucleic acid replication, and genetic fine structure. Subsequent chapters treat the chemical structure of proteins in relation to biological activity, speciation, mutation, and fidelity of synthesis. The final chapters concern the present knowledge of the mechanism of protein biosynthesis and the possible relation of all the foregoing to organic evolution.

In spite of its many obvious virtues, it is difficult to be unreservedly enthusiastic about this book. There is, first of all, the matter of the quite inappropriate and misleading title. If "molecular basis of evolution" has any meaning, it presumably denotes the pre-biotic development of organochemical molecules in the oceans of the Archeozoic, a problem nowhere mentioned in this book. Evolution, molecular or otherwise, really enters the discussion only in the opening and closing chapters. Secondly, one cannot escape the suspicion that the book has been written in so much of a hurry that neither the author nor the friends and colleagues whose help the preface acknowledges spent very much time going over an early draft, for otherwise they would surely have corrected the numerous flaws in style and grammar in which the text abounds. They would have also noticed that any potential reader first needing to be told about evolution on the level of "High School Biology Self-Taught" might have a little trouble with all the technical

terms and laboratory jargon sprung on him in later chapters without further explanation. Finally, it is slightly disturbing to find in one or two places that the author has not really understood everything he is writing about, as in the rather mixed-up discussion of chromosome replication. But these criticisms should not weigh heavily against the fact that so far this is the only book available in which all these important matters are well-presented together. I, therefore, recommend "The Molecular Basis of Evolution" to the general scientific audience, for after spending a few pleasurable hours with this book almost everyone will be sure to get a pretty fair idea of what molecular biology (though not evolution) is all about.

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**Chemistry of Carbon Compounds.** Volume IV, Part B. **Heterocyclic Compounds.** Edited by E. H. RODD, D.I.C., D.Sc., F.C.G.I., F.R.I.C. D. Van Nostrand Company, Inc., 120 Alexander Street, Princeton, New Jersey. 1959. xviii + 654 pp. 15.5 × 23 cm. Price, \$24.00.

Part B of the heterocyclic section, Volume IV, of what has come to be known as Rodd, has now appeared, and treats compounds with six-membered rings containing oxygen and sulfur and related natural products, compounds containing two fused five or six-membered rings each containing one hetero atom, cyanine dyes, compounds of the indigo group, pyrrole pigments, compounds containing unusual hetero atoms and, finally, compounds with six-membered rings containing two nitrogen atoms.

It is the second volume of the series to contain a chapter by one of its distinguished advisors, the chapter on Brazilian and Haematoxylin having been prepared by Sir Robert Robinson. Other contributors are G. de W. Anderson, Ishbel G. M. Campbell, N. Campbell, J. K. Landquist, G. R. Ramage and T. S. Stevens.

Rodd is the authoritative text in the English language, and the appearance of this penultimate volume is welcome.

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**Methoden der Organischen Chemie (Houben-Weyl).** Vierte, Völlig Neu Gestaltete Auflage. Band I. **Allgemeine Laboratoriumspraxis.** Teil 2. Edited by EUGEN MÜLLER, Tübingen. With O. BAYER, Leverkusen, H. MEERWEIN, Marburg, and K. ZIEGLER, Mülheim. Georg Thieme Verlag, Herdweg 63, Stuttgart, Germany. 1959. xiv + 1017 pp. 18 × 26 cm. Price, \$46.65; subscription price, \$42.00.

In 1953, it was my privilege to welcome, on behalf of the Journal, the fourth edition of the great compendium under review, and the reader is referred to those pages for a general appraisal of the series.

The volume at hand completes the section devoted to "General Laboratory Practice" and again covers operations ranging from work in laboratory glassware to pilot-plant preparations. The first section deals with comminution of solids, and mixing of phases, as in emulsions or as in foams. The American chemist or chemical engineer may find this section interesting but of limited value because, naturally, it is addressed to an audience accustomed to the use of Central European machinery.

Under the heading "General Laboratory Methods" we hear about operations which are not routine laboratory occurrences, but a discussion of which will be found helpful by all those who suddenly face one of these situations. The material deals with the accurate measurement of liquid and gaseous flow, preparation and purification of gases, operations under exclusion of air and moisture, handling of explosives, working under pressure or *in vacuo*, temperature control and measurement, and finally micro-preparative methods. The American reader may find suggestions unfamiliar to him among the wealth of arts and crafts compiled here, and he may welcome the convenience of having them available in one volume.

There follow two excellent and useful sections treating common solvents and their purification and the properties of laboratory drying agents.

Another chapter deals with the prevention and first aid in case of accidents, by such agencies as mechanical means, fire, explosions, corrosive substances, poisons, electricity, and radioactive compounds. A table of dangerous compounds concludes the section, perusal of which can be recommended to every chemist. The final and unique chapter describes known chemical carcinogens, and endeavors to guide the practicing chemist to exercise reasonable care in handling those insidious substances that are lacking "acute toxicity" in doses capable of triggering malignant growth long after exposure.

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## BOOKS RECEIVED

FEBRUARY 10, 1960—MARCH 10, 1960

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FREDERICK R. EIRICH, Edited by. "Rheology Theory and Applications." Volume III. Academic Press, Inc., 111 Fifth Avenue, New York 3, N. Y. 1960. 680 pp. \$21.00.

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INTERNATIONAL ATOMIC ENERGY AGENCY. "List of References on Nuclear Energy." Volume 1, Number 6. "International Atomic Energy, Vienna. 15 December 1959." Library, International Atomic Energy Agency, Kärltnering 11-13, Vienna I, Austria. 1959. 76 pp.

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HENRY A. LARDY, Editor-in-Chief. "Biochemical Preparations." Volume 7. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1960. 102 pp. \$5.25.

F. MANDEL. "Introduction to Quantum Field Theory." Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1959. 202 pp. \$6.00.

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BENNO REICHERT. "Die Mannich-Reaktion." Springer-Verlag, Heidelberger Platz 3, Berlin-Wilmersdorf, Germany. 1959. 195 pp. DM. 36.--.

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