Enzymatic Synthesis of DNA. CIBA Lectures in Microbial Biochemistry. By ARTHUR KORNBERG. John Wiley and Sons, Inc. 440 Park Avenue South, New York 16, N. Y. 1962. ix + 103 pp. 13 × 19 cm. Price, $4.00.

This little book is a classic of its genre.

The emerging understanding of the role of DNA in directing its own replication is providing an answer in molecular terms to one of the basic riddles of life. The discovery and characterization of the enzyme system involved in this replication, which is the principal subject of this book, is one of the major achievements of modern biochemistry. One of the more unusual aspects of this achievement is that it has been, very largely, the accomplishment of one laboratory under the direction of the author.

In three brief, straightforward, and fact-crammed chapters Dr. Kornberg discusses the *in vitro* replication of DNA, the *de novo* synthesis of and the properties of two new forms of DNA, hitherto unknown in nature, and the unusual aspects of DNA synthesis in "T-even" bacteriophage infection with special attention to the substitution of cytosine by hydroxymethylcytosine and the glucosylation of the latter. Most of this material has been published in the journals. Here it is drawn together, organized, and the logic seems, as it should, inevitable. The impressive size of the steps that have been taken is splendidly evident.

In only one respect did I find this book disappointing. It would have been of great interest if the author had taken this opportunity to distinguish, in a most critical sense, between what has actually been demonstrated and what is, however plausible, as yet only surmise; to consider what distinctions may exist between what has been demonstrated, *in vitro*, and what occurs, *in vivo;* and to review from his vantage point the various impacts of these great discoveries upon many areas of biological thought. In short, having presented his work, to stand outside it. Perhaps he will write a companion-piece.

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Structural Carbohydrate Chemistry. By E. G. V. PERCIVAL, revised by ELIZABETH PERCIVAL, Lecturer in Chemistry at the University of Edinburgh. J. Garret Miller, London. 1962. Second Edition. 360 pp. 22 × 15 cm. Price, 40 s.

This second edition of "Structural Carbohydrate Chemistry," first published in 1949, has been extended from 246 to 360 pages and now has 13 chapters, instead of the former 11, which deal with: (1) General properties, configurations, and interrelationships of the monosaccharides; (2) The sugars as ring forms; (3) Characteristic reactions of sugars involving hydroxyl groups; (4) Sugar anhydrides and amino sugars; (5) Natural glycosides; (6) Other important natural products: (7) Disaccharides; (8) Oligosaccharides; (9) Polysaccharides; (10) Structure of starch, glycogen, and related glucans; (11) Other neutral polysaccharides; (12) Uronic acids and polyuronides; and (13) Polysaccharides containing nitrogen and sulfur.

Compared with the first edition this second edition shows little alteration in the first four chapters except for the welcome and necessary addition of a section on conformational analysis and the introduction of new knowledge of the sugar osazones. Inclusion of more information bearing on the newer developments of the mechanism of carbohydrate reactions would have been desirable considering the present state of our knowledge of reaction mechanisms in carbohydrate chemistry in particular and organic chemistry in general.

Since many of the developments of stereochemistry have emerged from studies of carbohydrates or related compounds and since stereochemistry plays such a major role in the chemistry and biochemistry of carbohydrate compounds, it is believed that a section on stereochemistry could have been included with advantage in this new edition. Such an addition would be of inestimable advantage to the student of organic chemistry because carbohydrate compounds lend themselves admirably to three-dimensional considerations and also because specialists in carbohydrate chemistry seem to have a better grasp of the teaching and understanding of stereochemistry and its significance in biological reactions.

This new edition embodies quite extensive additions to and rearrangements of the sections dealing with polysaccharides, but in spite of these revisions, the clarity of expression which characterized the first edition has been largely maintained. The modern methods available for attacking structural problems are included and it can be said that anyone who takes the time to familiarize himself with the factual material in this new edition may plunge into the most recent developments in carbohydrate chemistry with confidence.

The few errors which appeared in the first edition have been corrected and at the same time the modern nomenclature for carbohydrate chemistry has been adopted throughout the text.

In an evaluation of the first edition, this reviewer noted that it represented the best textbook on structural carbohydrate chemistry in the English language. The same conclusion has been reached concerning this second edition. Indeed it can be said that anyone who seeks to ascertain the present status of structural carbohydrate chemistry would do well to peruse this edition and, though it is not replete with references, it is an excellent first reference for the specialist. The book is recommended highly for students as well as those engaged in the research and teaching of carbohydrate chemistry.

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Quantitative Problems in Biochemistry. EDWIN A. DAWES, Senior Lecturer in Biochemistry, University of Glasgow. The Williams and Wilkins Company, 428 East Preston Street, Baltimore 2, Maryland. 1962. xi + 295 pp. 14 × 22 cm. Price, $7.50.

In this compact volume Dr. Dawes presents a unique and fascinating contribution to biochemistry, covering in particular the applications of physical chemistry to biochemistry. Specific quantitative numerical problems in a broad spectrum of fields are presented for solution, actual problems taken from published work in the literature. In connection with each field there is a lucid introduction. The author states with undue modesty that "there has been no attempt to produce a textbook of physical biochemistry; the emphasis remains on the problems." However, considering the introductions to the successive chapters, the well chosen specific problems that are offered as examples, and the references to authoritative sources, it would be difficult to conceive a better guide to a working knowledge of most of the fields in which physical chemistry is being applied to biology. The chapters include the various methods of determining molecular weights, especially those of macromolecular substances, the acid–base relations of electrolytes, including amino acids and proteins, the laws of thermodynamics, reaction equilibria and kinetics, including the kinetics of enzymic reactions, photometric procedures, applications of the Haldane–Barcroft–Warburg manometric techniques, oxidation–reduction potentials, and a final chapter on the applications of stable and radioactive isotopes to various problems, including turnover rates, identification of precursors, isotope dilution analysis, and utilization of isotopes in following metabolic pathways.

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Quantitative Chemical Micro-Analysis. C. J. VAN NIEUWENBURG and J. W. L. VAN LIGTEN. American Elsevier Publishing Co., Inc., 52 Vanderbilt Ave., New York 17, N. Y. 1963. 13.5 × 19.5 cm. 181 pp. Price, $6.00.

In this valuable little book, the two internationally known authors have made available to the world a system of gravimetric and volumetric microanalysis that was developed in their laboratory during the past ten years. Previously, this system had been described only in pamphlets which were distributed to their students. Obviously, this work would be a valuable addition to anyone's library.

The book is divided into seven chapters. The first of these is a general introduction, which includes a background of historical development and a discussion on the advantages and disadvantages of microgravimetric analysis. The authors predict that "microanalysis will become the standard form of chemical analysis," and the reviewer is inclined to agree with this prediction. The latter part of the chapter deals with the introductory material on microvolumetric analysis.

Chapter Two deals with the apparatus used for microgravimetric analysis and includes: precipitation, filtration, directions for preparing filters and filter sticks, drying and weighing procedures, separation, and preliminary work procedures.

Chapter Three devotes fifty-three pages to the subject of single microgravimetric determinations. One hundred and eight determinations, beginning with aluminum and proceeding in alphabetic order, are clearly described (about one-half of a page is devoted to each). For some elements, more than one procedure is given; for example, there are five for cobalt and seven for copper. In addition to the procedures for the individual elements, procedures for ferrocyanide, nitrate, phosphate, silicate, and sulfate are included.

Chapter Four is devoted to thirty-nine microgravimetric separations, such as silver from copper, silver from nickel, calcium from magnesium, etc., and they are listed in a natural sequence. Here, too, each procedure occupies about one-half of a page.

Chapter Five consists of eight pages and is devoted to the apparatus used for microvolumetric analysis—microburets, micropipets, stirrers, and a microdiffusion unit.

Chapter Six deals with the subject of microvolumetric determinations and lists fifty-seven procedures; some are for the determination of one element and some are for the simultaneous determinations of two (or even three) elements in mixtures; for example, aluminum and magnesium, zinc and magnesium, nickel and silver, and iron, calcium, and aluminum. The determinations of ethanol and sulfate are also included. Forty-six of the determinations are classified as EDTA titrations, and the remaining elevens are miscellaneous. For the most part, the latter are iodometric. Directions for preparing four useful buffer solutions used in connection with the titrations are also included.

The last chapter consists of thirty pages devoted to semimicro organic elementary analysis; however, the authors state that the procedures can generally be done on a micro scale if the directions and the size of the apparatus are modified. In addition, they state that they have included only those methods which they find can be carried out by students in one afternoon during a practical course. These are carbon–hydrogen, halogens, nitrogen, sulfur, and molecular weight. For the determination of carbon and hydrogen, methods using silver orthovanadate and silver permanganate are given. The determinations of chlorine, bromine, and iodine are done by destructive hydrogenation; oxygen flask combustion is included for the chlorine determination alone. Three methods are described for nitrogen; namely, the ter Meulen (destructive hydrogenation), the Dumas, and the Kjeldahl. For the determination of sulfur, the authors have presented two methods: the ter Meulen (destructive hydrogenation) and combustion in a current of air. Finally, the authors have given their own method for the determination of molecular weight, which is based on the principle of isothermal distillation. It yields results within 20 to 24 hr. and is subject to errors of up to 10%.

In conclusion, the reviewer again wishes to emphasize that this little book is very worthwhile. It would be invaluable to those persons involved in small-scale manipulations, particularly in the inorganic field.

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