

H, 4.77; N, 18.1. Found: C, 47.8; H, 4.95; N, 17.7). VIII was treated with HBr-acetic acid and the reaction product isolated as the monohydrobromide (IV).

Compounds III and IV were coupled by the pyrophosphite method and ether added to the reaction mixture. The resulting precipitate was dried and treated with sodium in liquid ammonia. The product in dilute aqueous solution at pH 6.7 was aerated and the solution concentrated and lyophilized. The material from several runs upon assay⁸ gave a total of 58,000 units of pressor activity. After purification by countercurrent distribution, the active material [$K = 0.84$ (*sec*-butyl alcohol-*p*-toluenesulfonic acid)] was subjected to electrophoresis in a pyridine-acetic acid buffer (pH₄) on a cellulose-supporting medium.⁹ The solution from the segment with peak activity assayed 15,500 pressor units and when lyophilized yielded a powder weighing 37 mg. which indicated a specific activity in solution of 400 units/mg. However, the material suffered partial inactivation¹⁰ upon lyophilization, assaying 175 units/mg.

In countercurrent distribution, electrophoresis and chromatography on partition and ion-exchange

(8) J. Dekanski, *Brit. J. Pharmacol.*, **7**, 567 (1952).

(9) H. G. Kunkel in "Methods of Biochemical Analysis," Vol. I, D. Glick, Ed., Interscience Publishers, Inc., New York, N. Y., p. 141.

(10) Samples of highly purified natural vasopressin have also on some occasions shown a loss in activity on concentration and lyophilization [R. A. Turner, J. G. Pierce and V. du Vigneaud, *J. Biol. Chem.*, **191**, 21 (1951); E. A. Popenoe and V. du Vigneaud, *J. Biol. Chem.*, **205**, 133 (1953)]. Studies are underway to determine the cause as well as to find means of avoiding such inactivation.

columns, the position of the activity of this final synthetic product was the same as that of the natural arginine-vasopressin. In addition to the assays against the U.S.P. Standard Powder for pressor activity, the product was assayed for antidiuretic¹¹ and avian vasodepressor¹² activities. The ratios between the pressor, antidiuretic and avian vasodepressor activities were the same as those found for natural vasopressin (1:1:0.15).

Further studies on the purification of the synthetic product are underway and it is hoped that an extensive comparison of its chemical and physical properties with those of natural arginine-vasopressin may eventually be carried out. Since the difficulties are considerable in reaching and maintaining maximum activity, it was felt that a report was warranted at the present time that a synthetic product synthesized according to the structure proposed for arginine-vasopressin (I) does possess the expected biological properties.

DEPARTMENT OF BIOCHEMISTRY VINCENT DU VIGNEAUD¹³
CORNELL UNIV. MEDICAL COLLEGE DUANE T. GISH¹⁴
NEW YORK, N. Y. PANAYOTIS G. KATSOYANNIS¹⁵

RECEIVED AUGUST 5, 1954

(11) The antidiuretic assays utilizing the hydrated normal dog were carried out by Professor H. B. van Dyke, Dr. K. Adamsons, Jr., and Mr. S. L. Engel, to whom we express our appreciation.

(12) J. M. Coon, *Arch. intern. pharmacodynamie*, **62**, 79 (1939).

(13) Appreciation is expressed to the Lederle Laboratories Division, American Cyanamid Company, for a research grant which has aided greatly in this study.

(14) Lilly Postdoctoral Fellow in the Natural Sciences, National Research Council.

(15) Fellow of State Scholarships Foundation of Greece.

BOOK REVIEWS

Dictionary of Organic Compounds, 4 Volumes. By SIR IAN HEILBRON, D.S.O., D.Sc., LL.D., F.R.I.C., F.R.S., and H. M. BUNBURY, M.Sc., F.R.I.C. Oxford University Press, 114 Fifth Avenue, New York 11, N. Y. 1954. Volume I, xvi + 654 pp.; Volume II, xvi + 845 pp.; Volume III, xvi + 838 pp.; Volume IV, xvi + 694 pp.; Each Volume—20 × 27 cm. Price, \$78.00 a set.

During the past twenty years Heilbron's "Dictionary of Organic Compounds" has become a standard reference work for chemists concerned with organic compounds. This dictionary has proved especially valuable in connection with research and courses involving the characterization of organic compounds. For these reasons it is fortunate that this valuable reference work has been revised and brought up to date. Over 2500 new entries are included in this revised edition. In addition, the original entries have been brought up to date to the end of 1950 and in some cases to 1953. After a random check of some of the compounds with which this reviewer is familiar it appears that the revision has indeed been comprehensive. The earlier data have in many instances been replaced or supplemented by more accurate and recent data.

The style and format are essentially the same as in the original edition. The compounds are arranged in alphabetical order and each entry contains the following information: structural and molecular formulas, physical properties including solubilities, characteristic chemical properties, functional derivatives and principal references. Am-

biguities which might be anticipated with an alphabetical classification have been minimized by the liberal use of cross references and by carefully stating the nomenclature rules in the introduction.

Although Heilbron's "Dictionary of Organic Compounds" is not as comprehensive as Beilstein or Elsevier's "Encyclopedia of Organic Chemistry," and by no means is intended to be, it offers the advantage of being more up to date and convenient to use.

The editors deserve praise for their efforts in making this revised edition available.

DEPARTMENT OF CHEMISTRY
UNIVERSITY OF WISCONSIN
MADISON 6, WISCONSIN

HARLAN L. GOERING

General Biochemistry. By WILLIAM H. PETERSON, Ph.D., Emeritus Professor of Biochemistry, University of Wisconsin, Madison, and FRANK M. STRONG, Ph.D., Professor of Biochemistry, University of Wisconsin, Madison. Prentice-Hall, Inc., Englewood Cliffs, New Jersey. 1953. v + 469 pp. 15.5 × 23.5 cm. Price, \$8.65.

Modern biochemistry owes its origins to two sources, agriculture and medicine, and has been nourished and sustained by numerous developments in the fundamental sciences of biology, chemistry and physics. Few scientific areas in recent times include so broad a scope of activity

comprising so many apparently unrelated methods, procedures and subjects of interest. It is easy to say that biochemistry deals with the chemical activities of living materials, but the very statement reveals the magnitude of the task which it sets for itself, and the literature which embodies its advances and progress now approaches a volume which is almost overwhelming. It is therefore all the more important that textual introductions to the area of biochemistry be concise and yet present in lucid fashion the great scope of its activity, the purposes which motivate it, and the rationale which underlies it.

The present treatise by Peterson and Strong serves these difficult tasks admirably. Coming as it does out of the great school of biochemistry at Madison the reader might expect a skilful grasp of the entire area by the authors, and is not disappointed. There is more than this, however, in the vivid and imaginative use of photographs and colored plates illustrating the debt which the progress of biochemistry owes to animal and plant pathology. While the fundamental and practical aspects of the subject are treated in balanced fashion, the possibilities of their reciprocal enrichment are not neglected, and the beginning student thereby receives the impression that the subject is alive and meaningful, and not merely a fascinating intellectual exercise. The book begins with a discussion of the role of water, and passes then to a lucid but conventional discussion of carbohydrates, proteins, nucleic acids and acidity. With the subsequent chapters on minerals, vitamins, enzymes, hormones, digestion, energetics, and plant, animal, and bacterial metabolism, the authors, with the assistance of Plaut and Burrell in certain chapters, write not only clearly but with the tone of authority. Each chapter in the book closes with a series of questions designed to test the reader's understanding, and with a group of selected references. The book itself closes with an appendix on the composition and energy value of foods, and lastly with a good subject index. A few errors appear in the text, thus, cystine is not dicysteine (p. 117), and whereas on p. 122 α, γ -diaminobutyric acid in polymyxin is given in the D-configuration, on p. 370 it is described as L. It is also suggested that in subsequent editions of the book the few photographs of amino acid and osazone crystals be deleted. The present treatise is enjoyable to read and is well recommended.

NATIONAL CANCER INSTITUTE
NATIONAL INSTITUTES OF HEALTH JESSE P. GREENSTEIN
BETHESDA, MARYLAND

CIBA Foundation Colloquia on Endocrinology. Volume VII, Synthesis and Metabolism of Adrenocortical Steroids. By W. KLYNE, M.A., B.Sc., Ph.D., Consulting Editor, G. E. W. WOLSTENHOLME, O.B.E., M.A., M.B., B.Ch., and MARGARET P. CAMERON, M.A., A.B.L.S., Editors. Little, Brown and Company, Boston 6, Massachusetts. 1953. xviii + 297 pp. 14 × 21 cm. Price, \$6.75.

This book records ideas and results by specialists in the field of adrenocortical steroid chemistry and metabolism from England, Israel, Mexico, Switzerland and the United States. The various chapters consist of papers on current original work up to July 7-10, the time the 1952 Ciba Foundation Colloquium was held in London. The material is divided into two sections: I, Synthesis of Adrenocortical and Related Steroids; and II, Metabolism of Adrenocortical Steroids.

In evaluating a book of this type one has to take into account both (a) the excellence of the editorial task and (b) the value of the factual contributions made by the speakers and participants in the colloquium.

Regarding the first point, one must acknowledge Dr. Klyne's careful and exacting management of the wealth of information presented. However, it should be noted that in the area of steroid nomenclature the British convention (which Dr. Klyne quite properly follows) differs in several important respects from the preferred American usage, *i.e.*, the unpronounceable hyphenation of a root word as in pregn-4-en-17 α -ol-3,20-dione *versus* 17 α -hydroxy-4-pregnene-3,20-dione.

In general part I contains a number of excellent studies on steroid chemistry running the gamut from sarmentogenin, lanosterol and ergosterol to stereochemistry and "the

chemical action of X-ray on some steroids in aqueous systems." Part II reflects the strong trend to investigate the intermediary metabolism of steroids *via* blood and enzymatic studies rather than excretion patterns which are less susceptible of quantitation and more likely to produce artifacts.

The verbatim inclusion of questions and comments following each paper has become an established feature of these volumes. It is obvious that an important benefit of such colloquia is the stimulating personal interchange of ideas which takes place during the discussion period, frequently bringing forth valuable information which would not otherwise have been recorded. Informally the scientist is freer to discuss and interpret than in a formal publication; hence when such informal comments are published it is the duty of the authors to edit their own sections carefully. In general this has been done. However, some of the authors were less diligent in the editorship than could be desired. Thus, in the discussion of the paper on 11-oxygenated steroids from sapogenins, the authors introduced (pages 92 and 94) literature references to their own 1952 and 1953 publications while at the same time ignoring prior pertinent literature references (*i.e.*, *C.A.*, 46, 8331 (1952); *THIS JOURNAL*, 74, 3962 (1952); 75, 412 (1953)). Unintentionally or otherwise, such lack of objectivity has the effect of debasing the high scientific purposes of the Ciba Conferences.

A fault common to all such published symposia is timeliness. By the time the book has become available much of its value has been lost through prior publication of the same and additional material which supersedes the work under discussion. However, many readers will find it convenient to have these papers available in book form. In general this book maintains the standards of the previous volumes in the series and the reviewer has found the work reported to be both interesting and stimulating.

RESEARCH DIVISION
THE UPJOHN COMPANY
KALAMAZOO, MICHIGAN

ROBERT H. LEVIN

Metabolism of Steroid Hormones. By RALPH I. DORFMAN, Ph.D., Associate Director of Laboratories, Worcester Foundation for Experimental Biology, Shrewsbury, Mass., and Research Professor of Biochemistry, Boston University, Boston, Mass., and FRANK UNGAR, Ph.D. Staff Member, Worcester Foundation for Experimental Biology, Shrewsbury, Mass. Burgess Publishing Company, 426 South 6th Street, Minneapolis 15, Minnesota. 1953. vi + 170 pp. 22 × 28.5 cm. Price, \$4.00.

This book is intended to serve as a ready reference for those interested in the metabolism of steroid hormones. It is essentially a summary of information and not a comprehensive or critical treatment of the subject. Liberal use of tables, charts and graphic formulas, and an adequate index facilitate location of specific information on the source and metabolic transformations of individual hormones. Nine tables are devoted to steroids that have been isolated from endocrine glands, blood, bile and urine. Also included are artifacts produced during the processing of urine and conjugates isolated from urine. The usefulness of these lists would have been enhanced by addition of values for the melting points and specific rotations of the compounds.

Biosynthesis of steroids and the actions of microorganisms on steroids are covered briefly. A chapter is devoted to a systematic summary of metabolic changes of specific chemical groups which occur *in vitro* and *in vivo*. Some attention is given to the enzymes which are known to affect steroids.

A chapter entitled "A Complete System of Steroid Metabolism" occupies 64 pages. In this system a chart is provided for each compound which possesses a Δ^4 -3-keto and a 17- or 20-keto group and all possible steroids derivable from that compound by changes in those groups; compounds isolated from natural sources are indicated and blank spaces are provided for addition of information as new steroids are isolated.

The specific relations of the steroid hormones of tissues to urinary steroids are summarized in tabular and graphic forms. It appears that the C_{21} -metabolites of C_{21} -hormones are predominantly compounds with the 5 β -configuration, whereas the metabolites of the C_{19} -hormones include considerable proportions of the 5 α -configuration. The latter