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 Burris 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.

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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-17α-ol-3,20-dione *versus* 17α-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.

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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 microörganisms 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 5β-configuration, whereas the metabolites of the C_{19}-hormones include considerable proportions of the 5α-configuration. The latter configuration predominates in the metabolites of 11-oxygenated C_{19}-steroids such as adrenosterone. On the basis of these relationships, conclusions are drawn as to the probable precursors of some of the steroids which are commonly present in human urine. These conclusions are interesting and worthy of consideration but they should be regarded with some reservation. Variations among individuals are rather large and many studies have involved individuals who were suffering from disease.

A few errors were noted. In the names of the D-homo compounds in Table II, 17α-methyl appears instead of 17a-methyl. "*i*-Androstane-3α-ol-17-one" should be *i*-androstane-6α-ol-17-one. This substance is almost certainly an artifact and would be placed more appropriately with the other artifacts in Table II. Some carelessness was noted in the citation of references. The large amount of information presented in compact form and the key references should make this book very useful for those interested in steroid hormone metabolism or in the nature of the urinary steroids.

MAYO CLINIC AND MAYO FOUNDATION
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Titanium and Its Compounds. By GORDON SKINNER, HERRICK L. JOHNSTON and CHARLES BECKETT. Herrick L. Johnston Enterprises, 540 W. Poplar St., Columbus, Ohio. 1954. iv + 174 pp. 18 × 27.5 cm. Price, $3.50 for paper bound copy and $5.00 for hard bound cover.

As the preface of this book reveals, most of the information contained therein was compiled in 1949 in a literature survey carried out in the Ohio Cryogenic Laboratory, and has been revised so as to cover most of the pertinent literature through 1951. The coverage includes data on the preparation of titanium and certain of its compounds, including the hydrides, oxides, halides, nitride and carbide, and the alkaline earth titanates. A final chapter on thermal decomposition and reduction processes involving TiO_2 and TiO is followed by 25 pages of appendices, containing thermal functions of elementary titanium and of the oxides, halides, nitride and carbide of titanium and of calcium titanate. The heats of formation of some titanium compounds are listed and there is included an alphabetical index of 553 references to titanium literature.

The obvious intent of the authors is to present in a compact form the essential facts—largely numerical data—taken from the literature of titanium. This purpose appears to have been accomplished with relatively few typographical errors. There is no subject index, but in a volume of this size the detailed Table of Contents probably suffices for this purpose.

The book has been reproduced by offset lithography and makes a neat appearance. It should prove to be a useful adjunct to the previously available sources of information on this element, particularly Gmelin's "Titan" and Barksdale's "Titanium."

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Les Constantes Physique des Compose Organique Cristallises. By J. TIMMERMANS, Professeur honoraire de l'Université Libre de Bruxelles. Masson et Cie., Éditeurs, Librairies de l'Academie de Médecine, 120 Boulevard Saint-Germain, Paris VI, France. 1953. 557 pp. 16 × 24 cm. 5200 Francs (about $15.00).

Those who are interested in the problem of the transition between the solid and the liquid states, or the transition between two solid states of organic compounds, will find much of interest in Professor Timmermans' latest book. Although organic chemistry is notable for the number of possible molecular configurations, compounds may be classified in a simple system based upon the values of their physical constants.

Where the length of the molecule considerably exceeds the transverse dimensions (fiber molecules) one has chain-like molecules of which there are several homologous series. All these series obey the principle of convergence of properties for an infinitely long chain. For example, the melting points of the longer members of these various homologous series converge at about 117°. This is verified by many other constants, such as molecular volume, heat of combustion, etc., which are properties of the molecule and not of the system. These molecules behave like rigid rods in the crystal, and show an alternating phenomenon (even-odd) for many of their properties (temperature, heat and volume of fusion, etc.) resulting from their symmetry about the main axis of rotation.

A second category of typical substances is the sheet-like molecule, where one of the molecular dimensions is much smaller than the others. Aromatic molecules are well represented in this group and their behavior is considerably influenced by the symmetry of the molecule. If the linkages between molecules in the crystal extend to the point where they reach the limits of the crystal, as in the case of Carborundum, one obtains a substance which exists as a distinct molecular species. There then results either a body in the form of a thin sheet, which can serve as a lubricant such as graphite (2 dimensions), or the very durable substances (Carborundum), or a body which decomposes at high temperatures in place of melting such as the proteins.

If the molecule is of such a nature that its symmetry permits rotation about itself, or if it is a sphere, one is concerned with the remarkable *spherical* category of matter. Characterized in the first place by their particularly small entropy of fusion, they present a number of curiosities. These spherical molecules have an elevated melting point with a strong saturated vapor pressure at the triple point. Many of these substances tend to sublime at atmospheric pressure rather than melt. Their great symmetry transforms them by crystallization into the cubic system. This has a tendency to form mixed crystals between substances whose formulas are clear cut and are at the same time antipodes of the same substance. Some of these materials exist as enantiotropes having a solid state transition whose heat of transition is considerably higher than the heat of fusion. The elevation of the fusion temperature with increase of pressure is more marked with these materials. Such spherical compounds possess a dielectric constant, a specific heat, a plasticity, etc., which strongly approaches that of the liquid state.

Thus, spherical molecules form a mesomorphic state apart from normal and anisotropic liquids. In the spherical molecules, the transition from the anisotropic to the isotropic forms takes place in the solid state. For normal liquids, it takes place at the melting point, while for anisotropic liquids it takes place in the liquid state at the "clearing temperature."

In addition to the text, the author presents numerous excellent tables among which are:

(a) Melting and transition point data on 56 molecules melting mainly below room temperature.

(b) Specific heat equations for 59 organic molecules melting at 25° or below.

(c) Specific heat sources for about 250 organic molecules.

(d) Melting points for over 2,000 organic compounds melting below 0°.

(e) All the homologous series where the freezing point for the members can be established. These curves support the author's "Law of Convergence."

(f) Melting and transition points together with the associated heat changes for about 1,000 organic molecules.

In addition, there is an extensive bibliography and a good index to the compounds treated in the book. This book should appeal to industrial and academic workers who are interested in the melting process and the behavior of molecules which undergo solid state transitions.

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