

## Book Reviews

**The Biosynthesis of Steroids, Terpenes, and Acetogenins.** By JOHN H. RICHARDS, California Institute of Technology, and JAMES B. HENDRICKSON, Brandeis University. W. A. Benjamin Inc., 1 Park Ave., New York, N. Y. 1964. x + 416 pp. 16 × 23.5 cm. \$18.50.

One of the most interesting and rapidly developing areas of organic chemistry is concerned with the routes of biosynthesis of natural products. An era of speculation is rapidly becoming an era of certainty. A summary of the field is welcome, especially an up-to-date one, but in the present book a high price is paid for this aspect in terms of numerous errors. Many formulas are erroneous, and many sections show evidence of haste. There is also often not a clear distinction between hypothesis and fact, and, in contrast to the more experimental facts, there is a somewhat cursory treatment of the origins of some of the ideas, which is a pity since one of the more interesting aspects of the subject is the role played by chemical ideas in the historical context of what facts were available at the time. The book does, however, collect much useful information and ideas.

Biochemical and biological aspects are largely ignored, although the development of the subject in a fruitful way clearly requires the closer linkage of chemistry and biology. The book is, unfortunately, unlikely to be suitable for biologists, and is a good summary of both the advantages and limitations of purely chemical approach.

The term "acetogenin" seems both erroneous and unnecessary; the term "polyketide" with a 50-year history focuses attention on the relevant aspects of both the acetate-malonate and propionate-methylmalonate pathways. The suffix "genin" has another accepted meaning, and the name suggests substances which produce acetic acid; furthermore, to be logical the terms steroids and terpenes would be included under the larger heading.

Withal, this is a useful and interesting summary, with many references, which is more suitable for those who already know something about the topic and which should be read with a somewhat critical eye.

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**Metabolism of Steroid Hormones.** By RALPH I. DOREMAN, The Worcester Foundation for Experimental Biology, Shrewsbury, Mass., presently Institute of Hormone Biology, Syntex Research, Palo Alto, Calif., and FRANK UNGAR, Department of Biochemistry, University of Minnesota Medical School, Minneapolis, Minn. Academic Press Inc., 111 Fifth Ave., New York, N. Y. 1965. viii + 716 pp. 19.5 × 26 cm. \$32.00.

This book replaces the now outdated, however, classical approach of the offset printing of its 170-page predecessor by the same title and authors that first appeared more than a decade ago (Burgess Publishing Co., 1953). The formats are similar, yet, in many ways dissimilar; the original version attempted to summarize the then relatively small number of references when compared to the voluminous literature references in this highly specific field of steroid metabolism. The present volume has done a remarkable job in this gargantuan task. Many of the areas only briefly presented in the former text are greatly expanded from the narrative as well as the tabular form of presentation; this, likewise, includes experimental data as well as charts and bar graphs which were absent in the original volume.

Chapter I, "Introduction," of the new text contains not only the customary presentation of the steroid molecule but is expanded to

include conformational analysis and a table of seventy trivial or common names as well as the systematic names of steroids. Also included is an excellent list of steroid metabolism reviews during the years 1953 to 1964.

Expansion of Chapter II, "Steroids Isolated from Natural Sources," from 12 to 33 tables and 24 figures of structural configurations, greatly improved and certainly updated the present text. Some table numbers do, but the majority do not, correspond to the figure numbers (example: Tables 1 through 4 correspond to Figures 1 to 4). Further in the chapter, Tables 21 to 30 correspond to Figures 17 through 24. This seems to be true throughout the book. These latter cited tables and figures catalog a large number and variety of steroids found not only in human urine, in health and disease, but also from the urine of many animals, including the cow, bull, steer, goat, mare, sow, monkey, chimpanzee, rat, guinea pig, and mouse.

An expansion of Chapter III, "Biosynthesis of Steroid Hormones," from 7 pages to almost 100 pages, reflects the rapid expansion of the areas of biosynthesis of steroids, as it now contains 21 tables and 29 figures.

With the expansion of Chapter IV, "Steroid Transformations by Microorganisms," to 39 tables and 38 figures, from five pages in the previous text, the steroid biochemist is offered the possibility of a new approach to the age-old problem of obtaining reference compounds. This alternate pathway, other than classical organic synthesis or as is most frequently done, writing friend and foe for "a few milligrams or less," offers real possibilities by means of microbiological transformations.

Chapter V, entitled "Catabolic Reactions of the Steroids," is likewise greatly expanded to 60 tables and 46 figures. The names listed in the references of this section read like a membership list of "Who is Who is Steroids"; this chapter will receive a great deal of use by workers in the area.

"Enzymes and Mechanism of Reactions," Chapter VI, summarizes hydrolylases, dehydrogenases, reductases, lactonizing enzyme, enzymes concerned with conjugation, enzymes concerned with deconjugations, and other miscellaneous enzymes. It represents an excellent narrative presentation.

Chapter VII presents an expanded, to 72 figures, version of "A System of Steroid Metabolism" that was begun in the previous text. It includes known and possible systems for correlating the present knowledge of steroid metabolism for both the neutral and phenolic steroids. This section represents approximately one-fifth of the entire book.

The remaining two chapters of the book, VIII and IX, are entitled "The Relationship Between Tissue Steroids and Metabolites in Blood and Urine" and "Steroid Hormone Production Rates," respectively. This latter chapter makes its first appearance in the new book. Both chapters are thorough reviews of the present state of the knowledge in these areas. Chapter IX presents data in the form of bar graphs, which are new to this expanded edition.

The references cited have been increased five-fold. Despite an apparent apology for errors on the part of the authors, there are surprisingly few in this extensively referenced text. The indexing is excellent; listings and cross-referencing have increased from 9 to 61 pages. This book will certainly fill a void on the bookshelves of not only the novice, but also will greatly serve the needs of the sophisticated investigator in the form of an excellent over-all reference text for rapid fingertip information.

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