Biochemical Compound

Glucuronic Acid, Free and Combined. Chemistry, Biochemistry, Pharmacology, and Medicine. GEOFFREY J. DUTTON, Ed. Academic Press, New York, 1966. 647 pp., illus. $25.

In 1950 Academic Press published a monograph of about 100 pages entitled *Biochemistry of Glucuronic Acid*, by N. E. Artz and E. M. Osman. According to its authors this short monograph was the first comprehensive review in this field. It may be of historical interest to recall that the authors were connected with a firm that produced pure D-glucuronic acid and glucuronates at low cost by catalytic oxidation of starch, a process patented at that time by chemists of the Peoria laboratories of the Department of Agriculture. Prior to the development of this new method glucuronic acid was an expensive chemical imported from abroad and prepared from glucuronide excreted in the urine of animals fed borneol or other glucuronogenic compounds.

The hopes engendered by reports of the curative effects of large doses of glucuronic acid in human arthritis were disappointed, and since 1950 the interest in glucuronic acid, as well as the information concerning its production and degradation, has changed. Thus the emphasis in the older monograph was on methods of determination and on "detoxication," that is, the conversion of exogenous and endogenous compounds of limited water solubility into the more water-soluble glucuronides. The pathways of biosynthesis of glucuronic acid and other uronic acids and the mechanism of the transfer reactions were unknown, as was the role of the degradation products of glucuronic acid and its lactones.

The present monograph, edited by G. J. Dutton, deals in nine chapters with the current information on this important and many-sided subject. The majority of the contributors are leading experts in their fields and have reviewed their subjects critically and interestingly. Only one chapter, that dealing with the chemistry of polysaccharides containing uronic acids, does not come up to the high standards of the rest. The renaissance of interest in glucuronic acid can be traced to four major achievements: (i) the isolation and characterization by Dutton and Storey of the active glucuronosyl donor as uridine diphosphate glucuronide and the determination, in Kalckar's laboratory, of the mechanism of its formation from uridine diphosphate glucose; (ii) the degradation of glucuronic acid and its lactone, which leads in part to the biosynthesis of ascorbic acid, in part to that of pentoses; (iii) the isolation, biosynthesis, and degradation of uronic-acid-containing polysaccharides; and (iv) discovery of the wide role of glucuronide formation in transport reactions and the hydrolysis of glucuronides by β-glucuronidase and its inhibition by various lactones. The role of glucuronosyl compounds in transport mechanisms deserves far greater attention than it has received. Do such compounds cross cell membranes as ionized compounds or as lactones which after passage may be opened enzymatically? What is the regulating mechanism that determines whether conjugation of hydroxyl groups occurs via glucuronic acid or via sulfate, since in many instances the two are utilized interchangeably?

Various chapters of the monograph contain many more unsolved problems which ought to be of interest to a greatly varied group of research workers. The book in general is very valuable in summarizing and systematizing data scattered through a wide range of disciplines and publications. It ought to be required reading for biochemists, physiologists, and pharmacologists and cannot fail to stimulate further research.

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The Magnetosphere

Radiation Trapped in the Earth's Magnetic Field. Proceedings of the Advanced Study Institute, Bergen, Norway, August–September 1965. BILLY M. MCCORMAC, Ed. Reidel, Dordrecht, Holland; Gordon and Breach, New York, 1966. 916 pp., illus. $45.

Billy McCormac is to be complimented, first for having assembled a fine program at a quaint and quiet site very suitable for informality and study, and second for his part in achieving the rapid publication of its proceedings. This latter accomplishment is no mean feat, for no fewer than 57 lectures (or papers) by about 75 authors are presented in the volume.

The book is divided into nine parts in accordance with the schedule of sessions held at Bergen and deals with trapped radiation, natural and artificial, and with a broad spectrum of closely related topics, both theoretical and experimental or observational. The outlook of most papers is that of pure or basic science, but a few deal with important engineering and technological matters too—such as shielding techniques and radiation damage to solar cells and electronic devices. At Bergen a great deal of enthusiastic discussion took place at the conclusion of most papers, and correspondingly in the printed volume, most of the presentations are followed by discussion sections. These discussions are often abridged and only paraphrase the actual exchanges, however, and much of the spirit and occasionally the intent has not been captured. At a few spots the editing has been so severe that it would have been better to omit the discussion entirely.

The articles presented in the text are for the most part fairly well written, but with the large number of contributors there is no rhythm or balance among the presentations. Some papers are stylish and comprehensive, some are presented in a form better suited to being read orally, some of the theoretical papers are overly descriptive and lack mathematical conclusiveness (which often is not even available), and at times the jargon of the specialists is over-exercised. But these are common difficulties for a monograph of this type and are not serious drawbacks. The printing and craftsmanship on the part of the publishers are outstanding, and I noted only a small number of technical errors, typographical in nature.

In summary, this monograph is scientifically up-to-date and possesses a wealth of information on the earth's radiation belts. The contributors to the book include many of the prominent "space" physicists of the western world who have contributed to our present knowledge of the magnetosphere. The book is more suitable for the expert than for the novice, but a cursory reading of it with a follow-up of more intensive reading from the references appended to each article would provide an excellent introduction to any of the areas covered. The scope of the volume is such as to include several papers that survey and report (often very qualitatively) the most recent research advances and some prospective plans.

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