

protein denaturation, providing many suggestions for possible future work. K. Linderström-Lang discusses the degradation of proteins by proteolytic enzymes, developing a systematic mathematical analysis for several types of hypothetical model systems and comparing the results with a number of important systems which have been studied experimentally. Even though the mathematical discussion should be regarded as preliminary, this paper goes far beyond any analysis previously attempted, to this reviewer's knowledge. It breaks important new ground and deserves the closest study by all who are concerned with such enzyme-substrate systems. The final paper by Hugo Theorell discusses the relations between prosthetic groups and proteins, with special emphasis on flavoproteins, on pyridine nucleotide proteins and on hemoproteins. Theorell has made major contributions to our knowledge of all these classes of proteins; so it is not surprising that this is a penetrating and admirable survey.

The quality of the whole discussion is uniformly high. Practically every contributor is an outstanding authority in the field which he discusses. Each paper or group of papers is followed by several pages of printed discussion; the discussion is lively and deals with many matters of fundamental importance, so that this constitutes one of the most interesting parts of the book.

The book is well printed, but typographical errors are very numerous. All the papers are printed in English, except one which is in French; most of the discussion is in English also. The typographical errors are probably largely due to the fact that the editor and publishers were working mostly with material in a foreign language. Fortunately, so far as I have discovered, the great majority of these errors are trivial and none is seriously misleading. It is regrettable that there is no index.

The Solvay Council is to be congratulated on the organization of the conference and on the book which has resulted from it. Those who are concerned with the present frontiers of knowledge in protein chemistry will find this book practically essential.

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JOHN T. EDSALL

Fibres from Synthetic Polymers. Edited by ROWLAND HILL, B.Sc., Ph.D., Imperial Chemical Industries, Ltd., "Terylene" Council, Welwyn and Manchester. Elsevier Publishing Company, 402 Lovett Boulevard, Houston, Texas. 1953. xv + 554 pp. 17 × 25 cm. Price, \$12.50.

This volume on purely synthetic fibers (as opposed to regenerated natural fibers or chemically altered ones) is an outstanding work. It is the effort of nineteen authors (including the editor who contributes also a brief historical introductory chapter), all English except for one American (G. H. Fremon) and two German fiber experts. Eleven of the authors are associated with Imperial Chemical Industries, Ltd.

The volume is directed toward the applied polymer scientist. However, fully two-thirds of the book is devoted to the basic aspects of linear polymers. These first thirteen chapters not only furnish authoritative summaries of the present-day chemistry of linear polymers, but also provide a basic conceptual understanding of the properties of synthetic fibers and the processes for making them. The latter are described chiefly in the last seven chapters of the volume.

In addition to basic ideas on polymerization, molecular weight, polymer structure and texture, melting phenomena and solubility, nearly all linear polymer formation reactions, both addition and condensation, are discussed. The technologies of melt extrusion, wet spinning and dry spinning of fibers are reviewed. The final four chapters deal with the properties and applications of synthetic fibers themselves, including their dyeing.

All of the presentations are clearly written and factual. References (including patents) are well selected and form a useful addition to the volume although their order is not always chronological. Particular commendation must go to the editor for the excellent organization of the book and to the authors who have fitted their individual chapters

into one of the best collaborative volumes this reviewer has examined.

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C. S. FULLER

Chemistry of Carbon Compounds. A Modern Comprehensive Treatise. By E. H. RODD, A.C.G.I., D.I.C., D.S.C., F.R.I.C. (Editor). The Elsevier Press, 402 Lovett Boulevard, Houston, Texas. Volume I, Part B. Aliphatic Compounds. 1952. pp. xvii + 779-1462. 17 × 23 cm. Price, \$17.50; to subscr., \$15.00. Volume II, Part A. Alicyclic Compounds. 1953. xxiii + 487 pp. 17 × 23 cm. Price, \$12.50; to subscr., \$11.25.

Two more sections of "Chemistry of Carbon Compounds" are now available, and they exhibit the high standards of coverage and exposition of the first section, reviewed in these pages last year (THIS JOURNAL, 75, 251 (1953)).

Part B of Volume I, which completes the treatment of aliphatic compounds, covers those bi- and polyfunctional compounds not treated in Part A of this volume, and thus contains in addition to systematically developed chapters on less important fields, discussions of sugars and carbohydrates, and amino acids and proteins. Unfortunately the systematic development has not allowed treatment of all the naturally occurring α -amino acids together, tyrosine, tryptophan, histidine and the like being reserved for later discussion. Whether the disadvantages of departing from system to handle all the amino acids together outweigh the advantages of such integral treatment seems to have been settled in favor of systematic handling in this case.

Volume II, covering the alicyclic compounds, is, like Volume I, divided into two parts, the first of which is now available. It contains a systematic development of alicyclic chemistry, beginning with a brief general treatment and proceeding through the various monocyclic systems to polynuclear systems of isolated, condensed, spiro and bridged types. Sections on carotenoids and polymers complete this part of Volume II. (Part B of Volume II will be devoted to terpenes and steroids.) Dr. R. A. Raphael has prepared all but two of the chapters of Part A.

All serious students of organic chemistry will wish to be familiar with these volumes.

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MARSHALL GATES

Biological Transformations of Starch and Cellulose. A Symposium held at The London School of Hygiene and Tropical Medicine on 21 February 1953. Biochemical Society Symposia No. 11. By R. T. WILLIAMS (Editor). Cambridge University Press, 32 East 57th Street, New York 22, N. Y. 1953. iii + 84 pp. 16 × 25 cm. Price, \$2.25.

This symposium contains clear and concise reviews by E. J. Bourne on the synthesis of polysaccharides similar to amylose and amylopectin by phosphorylases and other trans-glycosidases; by W. J. Whelan on the enzymic hydrolysis of these polysaccharides; and by G. O. Aspinall on the chemistry and chemical degradation of cellulose. These topics have been more fully reviewed elsewhere; the last especially receives very sketchy treatment here, particularly with regard to oxidative degradations. A less familiar note is struck by Helen Porter in an attempt to assess the significance of the starch-forming or starch-splitting enzymes in the living leaf: it has been found that destarched leaves supplied with (say) radioactive glucose and ordinary fructose will synthesize a sucrose in which the two moieties are almost equally radioactive, though the free fructose gains very little activity; this leads to the view that free glucose and fructose are not interconvertible, that they are slowly and with consumption of energy converted into derivatives, probably phosphates, which are readily interconvertible and readily used to form sucrose or (in the case of the glucose derivative) starch. M. V. Tracey's critical review of studies on cellulases is welcome because the literature is so scattered; he points out that the insolubility of

the substrate raises unusual difficulties. In a stimulating little note N. W. Pirie points out that a cheap source of potent cellulase would have great economic importance; he wonders, too, why evolutionary mechanisms have not provided the herbivorous mammals with a cellulase of their own (might there be some vital structure in the alimentary tract which it would destroy?), so that they are dependent on the inefficient aid of their symbiotic microorganisms, whose action is discussed in another chapter by A. T. Philipson. Lastly, R. G. Fargher whets rather than satisfies our curiosity with a brief sketch of the subject of damage to textile fibers by microorganisms, especially moulds, and of the very various methods that have been proposed as preventives.

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Chromatography: A Review of Principles and Applications.

By EDGAR LEDERER, Institut de Biologie Physico-chimique, Paris, and MICHAEL LEDERER, Institut du Radium, Paris. Elsevier Publishing Company, 402 Lovett Boulevard, Houston, Texas. 1953. xviii + 460 pp. 16 × 23.5 cm. Price, \$9.25.

The monograph under review constitutes an extended translation and combination of the following two books: "Progrès récents de la chromatographie, Première Partie, Chimie organique et biologique" by E. Lederer and "Deuxième Partie, Chimie minérale" by M. Lederer (Paris, Hermann et Cie, 1949 and 1953). Recently, the second of these texts has been reviewed by Steward.¹ The present English version has been carefully brought up to date.

In their Preface the authors state: "This book represents a review of the chromatographic methods developed in the last 10 to 12 years." The qualification of the volume (contained in the French titles) as a progress report could well have been indicated in the English title. While the book represents an authoritative review of the progress made in the field of chromatography during the last decade or so, as a rule it does not endeavor to present basic knowledge gained earlier.

The authors have collected and selected their material with patience and care, and their documentation is based on the evaluation of about 1900 literature references. Any writer surveying chromatography soon finds himself in the position of the Sorcerer's Apprentice on whom an avalanche of new data is descending every day. Thus, the authors had to supplement their Bibliography with an Addendum listing some 300 papers that appeared during the printing period.

No detailed discussion of the theories of chromatography is offered in this book, and the reader is referred to a forthcoming volume written by A. J. P. Martin and A. T. James. Such division of the material does not reduce the value of the volume under review since, unfortunately, theories have had but a limited influence on chromatographic experimentation so far.

The following main sections of Lederer's monograph appear to have been well balanced: general discussion (100 pages), treatment of organic compounds (182 pp.), of inorganic substances (67 pp.) and, finally, bibliography and indexes (111 pp.). Special emphasis has been laid on the presentation of the two most modern and astonishingly fertile methods, *viz.*, paper chromatography and ion exchange.

Considering the richness of the content and the available space, it is understandable that the reader in most instances will not be able to carry out experimental work without consulting original papers. Nonetheless, this reviewer would suggest that detailed experimental directions could have been included in a limited number of typical instances. With reference to details only a few critical remarks seem to be justified. Perhaps it should be pointed out that the

(1) F. C. Steward, *THIS JOURNAL*, **75**, 5772 (1953).

chromatographic tubes represented in Fig. 9 are inferior to those equipped with ground glass joints.

Lederer and Lederer's monograph is well printed and excellently illustrated by means of 88 comprehensive figures and a colored plate. Its use is recommended to everybody interested in the manifold laboratory methods based on fractional adsorption and in the influence of chromatographic techniques on the development of various branches of pure and applied chemistry.

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March 10, 1954—April 10, 1954

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