

1 H) in the nmr spectrum. The addition of trifluoroacetic acid to the nmr sample caused the aldehyde singlet to disappear. Following the acid treatment the unaltered free base was recovered by extraction with dilute alkali. No hydroxyl bond was observed in the infrared spectrum ( $\text{CHCl}_3$ ) of the free base.

Vakognavine is an interesting subject for biogenetic speculation. The C(19) aldehyde is a plausible alternate to the pseudokobusine (I) structure as an intermediate in the biosynthesis of the hetisine-type skeleton. The C(19) hydroxyl of the cation is reminiscent of the oxazolidine oxygen of isoatisine (IV).<sup>11,12</sup>

(11) Cf. S. W. Pelletier and L. H. Keith in "Chemistry of the Alkaloids," S. W. Pelletier, Ed., Van Nostrand-Reinhold, Princeton, N. J., 1970, p 514 ff.

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(12) Observed and calculated structure factors will appear following these pages in the microfilm edition of this volume of the journal. Single copies may be obtained from the Reprint Department, ACS Publications, 1155 Sixteenth St., N.W., Washington, D. C. 20036, by referring to author, title of article, volume, and page number. Remit check or money order for \$3.00 for photocopy or \$2.00 for microfiche.

S. W. Pelletier,\* K. N. Iyer, L. H. Wright, M. Gary Newton

Department of Chemistry, University of Georgia  
Athens, Georgia 30601

N. Singh

Department of Chemistry, Punjabi University  
Patiala, India

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## Book Reviews\*

**Modern Chemical Science.** By JACK E. FERNANDEZ (University of South Florida). The Macmillan Co., New York, N. Y. 1971. xii + 288 pp. \$8.95.

This is one of a number of recent books which are aimed at scientifically—chemically in particular—educating the nonscience major. It relies upon a partly historical approach to chemistry but also delves into the details of structure and its effect upon molecular behavior as in the discussion of polymers, synthetic diamonds, carcinogenic activity, and molecules with biological interest such as amino acids, steroids, vitamins, etc.

The book is well written although somewhat terse and is well produced, the diagrams being well chosen and well simplified. Perhaps the only jarring note to this reviewer is the somewhat excessive detail—particularly instrumental such as in Chapter 7—which surely cannot be necessary in such a discourse. The relevance of nuclear magnetic resonance spectroscopy is undoubted, but for the nonscience major the number of conceptual bases needed to understand the methods is greater than most nonscience majors either have or wish to obtain.

The book represents, however, a useful start on the long road of integrating what science has discovered in the 19th and 20th centuries, into the cultural environment of all people—scientists and nonscientists alike.

T. M. Dunn, University of Michigan

**Chemical Slide Rule.** Verlag Chemie, Weinheim/Bergstr., Germany. 1971. DM 34.

It is perhaps unique to "review" a slide rule in a book-review section, but there is justification in this instance. The item is an attempt to incorporate in an instrument what heretofore has been published in book form, and it is put out by a publishing firm. It is designed primarily for calculations of formulas of organic compounds from analytical data, or of per cent compositions from empirical formulas, although it has many other capabilities, including most of those of a conventional slide rule.

Calibrations for atomic weight multiples and ratios for a large number of elements extend up to  $\text{C}_{60}$  and allow formulas to be determined fairly quickly. Per cent compositions, on the other hand, can be calculated only to the first decimal place. The shortness of the rule (7.5 inches overall) is thus a drawback.

Will it make such books as Krzikalla's "Rechentafeln," Gysels' "Tables of Percentage Composition," Stout's "Composition Tables," and Dewar and Jones' "Molecular Weights and Percentage Compositions of Organic Compounds" superfluous in the library? Definitely not; these books give one more significant

figure, which is essential to modern research chemistry. Would it be useful to the individual chemist? Certainly, for it would save him many a trip to the library when interpreting analytical results. The organic chemist who does not already own a slide rule would probably find this one better suited to his needs than the general-purpose types.

**Structure and Bonding. Volume 9.** Edited by P. HEMMERICK, *et al.* Springer Verlag, New York, Heidelberg, Berlin. 1971. 266 pp. \$18.50.

This soft-bound volume, which appears to stand somewhere between a periodical and a book series, contains six articles of a review nature, covering transition metal halides, derivatives of  $\beta$ -diketones, ferrous diimine complexes, the nephelauxetic effect, and *ab initio* calculation of vibrational frequencies.

**Thin-layer Chromatography. Cumulative Bibliography II. 1967–1969.** Edited by D. JÄNCHEN. CAMAG, Muttenz, Switzerland, and New Berlin, Wis. 1970. 220 pp. Price not stated.

This soft-bound volume lists over 3000 papers, grouped into 32 categories (four on reviews, theory, and methods, and 28 on classes of substance). Within each category, the references are listed in alphabetical order of the first author's name. The full title of the article (with English translation if needed) is given, together with a short annotation or abstract that nearly always gives the adsorbent and solvents used. There is also a section on thin-layer electrophoresis.

**Chemistry and Molecular Biology of the Intercellular Matrix.** Edited by E. A. BALAZS (Boston Biomedical Research Institute). Academic Press, London and New York. 1970. x/xix + 1874 pp. £20.

This is a remarkably thorough survey of the components of the intercellular matrix and of their possible interactions among themselves and with the cells which generated them. In three volumes logically are organized 134 papers, some short and some extensive, which update research on the chemistry, structure, and metabolism of collagen, elastin, and the glycosaminoglycans.

The compilation begins with a guide to nomenclature, a set of rules for the contributors. By implication, it is hoped that others will follow them too and thereby curtail the minting of whimsical terms. Then a historical overview, Reflections on "Mucopolysaccharides" and Their Protein Complexes, by Dr. Karl Meyer, who has labored diligently and effectively to broaden our knowledge of these complexes of biopolymers, sets the scene. Thereon follow sections on: (1) chemistry and structure of collagen; (2) metabolism of collagen; (3) chemistry and structure of basal

\* Unsigned book reviews are by the Book Reviews Editor.

lamina; (4) chemistry and properties of elastin; (5) chemistry, structure, and metabolism of hyaluronic acid; (6) chemistry, structure, and metabolism of sulfated glycosaminoglycans and their proteoglycans; (7) interaction between glycosaminoglycans and cations; (8) interaction between proteoglycan and collagen; (9) biological function of the matrix; (10) the production of proteoglycans in normal and pathological conditions; (11) immunological and pathological aspects of the matrix; (12) degradation of the matrix; (13) the role of matrix in wound healing and development.

On reading through the papers one senses that matrix biology is a dynamic field. There still is much to be learned about the chemistry of the components, but this and an interest in further identification of new components are overshadowed by a growing interest in the biology of the matrix. Questions on the interrelationships of the components, their immunogenic potential, and how they influence cells and are influenced by cells stand out. Answers to such questions may well give an insight into the mechanisms involved in calcification and extend our understanding of connective tissue diseases.

Periodically there is a need for a critically detailed topographical map of an area of endeavor. These three volumes may be regarded as such and more. They contain the story of where matrix biology stood as of a year ago, and they contain suggestions of the paths whereon both older and younger investigators may tread.

D. Dziewiatkowski, *School of Dentistry, University of Michigan*

**Textbook of Polymer Science. Second Edition.** By F. W. BILLMEYER, JR. (Rensselaer Polytechnic Institute). Wiley-Interscience, New York, N. Y. 1971. xiv + 598 pp. \$15.95.

This new edition of Professor Billmeyer's textbook should be welcomed by teachers of polymer chemistry and others who wish to have updated versions of the first edition or his earlier "Textbook of Polymer Chemistry" (an excellent book which, surprisingly, is not mentioned in the current edition or any of the associated advertising). The book is a lucid presentation of the current state of polymer science treated under five main headings. Part I consists of four chapters that present basic information on polymer chains and their characterization. Part II (three chapters) treats the structure and properties of bulk polymer under such topics as morphology and order, rheology and mechanical properties, and the effect of structure on physical properties. Part III contains five chapters that give a systematic presentation of the various classes of polymerization. Part IV treats the properties of commercial polymers in three chapters, and Part V presents, essentially, a brief listing of the processing techniques for converting polymer into plastics, fiber, or elastomers with a short chapter devoted to each topic.

Certain aspects of polymer science were well understood when the first edition was published. These sections have had very minor revisions. Other aspects of the science, such as the morphology of extended chains and the mechanism of coordination polymerization, have been the topics of extensive research in the intervening years. Revisions to incorporate this new material are, of course, extensive. The sections of the book that treat the physical aspects of polymer science are the most useful. Part V, on the other hand, is particularly weak with less than a page, for example, assigned to each of the topics of injection molding and extrusion, and the text

gives no indication of the sophisticated technology available for these or other processing techniques.

The stated objectives for this edition are use as supplemental reading for students in various disciplines, as a textbook, and as a reference and guide to the literature. This reviewer has had a copy of one or the other of the precursor volumes on his desk for nearly 15 years and can recommend the second edition for supplemental reading and as a concise reference work. It will probably also be a good textbook. Problem solving is an essential part of a learning process, however, and the textbook role is hurt by the absence of problems.

One valuable feature of the earlier books that has been greatly diluted in the second edition is its usefulness as a guide to the published literature. With a few exceptions the references cite encyclopedia articles rather than original literature. A check of only six chapters, for instance, showed that 190 out of 258 references were to one or the other of two standard encyclopedias, each of these references being printed in full bibliographic form altogether occupying some dozen pages. Certainly, these encyclopedias are excellent reference works. The manner of handling, however, seems a little overdone. Another deletion from the earlier edition is the appendix section that listed trademarks, generic terms, and manufacturers. This reviewer had found the list useful on many occasions. Space saved by eliminating the multiple references could have been spent profitably on including this section.

There appear to be few errors, although the first reference this reviewer checked gave an incorrect year of publication. There also seems little excuse for the inaccurate terminology of the polymer classes in the sections on Fluorine-Containing Polymers. The hydrofluoro and chlorofluoro polymers, for example, are clearly not fluorocarbons.

Readers with copies of the earlier volumes will continue to find them useful for the access they provide to the literature and for the many sections that remain little changed. (Scanning this new edition for the revised material, however, is rewarding.) Others will find this second edition of Billmeyer's textbook a useful addition to their libraries.

Carleton A. Sperati, *E. I. du Pont de Nemours & Co.*

**Annual Survey of Photochemistry. Volume 2. Survey of 1968 Literature.** By NICHOLAS J. TURRO, GEORGE S. HAMMOND, JAMES N. PITTS, JR., DONALD VALENTINE, JR., A. D. BROADBENT, JACK E. LEONARD, FREDERICK D. LEWIS, DAVID M. POND, and ERIC WHITTLE. Wiley-Interscience, New York, N. Y. 1970. xiv + 412 pp. \$19.95.

This survey follows the format of the previous volume in the series in covering the photochemical literature of 1968 in four major divisions: organic photochemistry, physical processes in organic photochemistry, photochemistry of gases, and inorganic and organometallic spectroscopy and photochemistry. A tremendous amount of information has been competently collected and correlated, but the absence of any index other than an author index makes the retrieval of this information difficult, although an extensive table of contents as well as other tables within the chapters summarizing the topics that were covered are available. The fact that the survey of the literature for 1968 was published late in 1970 is regrettable.

S. N. Ege, *University of Michigan*