

Book Reviews

The Alkaloids. Vol. 3. Senior Reporter, J. E. Saxton. Specialist Periodical Report of the Chemical Society, London. 1973. ix + 337 pp. 13.5 × 21.5 cm. £8.50 (Chemical Society Members £5.25).

The third volume comprises reviews in the whole field of alkaloid chemistry for the period July 1971–June 1972. R. B. Herbert (University of Leeds) included several compounds (*e.g.*, pyrrolnitrin, gliotoxin, pyocyanin) produced by microorganisms in his review of the biosynthesis of alkaloids. He also reviews the Solanum and Veratrum alkaloids. V. A. Snieckus (University of Waterloo, Canada) contributed chapters on the pyrrolidine, piperidine, pyridine, quinoline, quinazoline, acridone, Amaryllidaceae, Erythrina, Lycopodium, and miscellaneous alkaloids. J. E. Saxton (University of Leeds) reviewed the tropane, pyrrolizidine, indolizidine, and quinolizidine alkaloids. The isoquinoline and related alkaloids are surveyed by M. Shamma (Pennsylvania State University). J. A. Joule (University of Manchester) discusses the indole alkaloids.

Those following the continuing saga of the *in vitro* interconversion of indole alkaloids (*e.g.*, tabersonine to catharanthine) may be brought up to date by consulting the more recent publications of Scott [*J. Amer. Chem. Soc.*, 94, 8262 (1972)] and Brown, *et al.* [*ibid.*, 95, 5778 (1973)]. The diterpene alkaloids are covered by S. W. Pelletier and S. W. Page (University of Georgia). F. Khuong-Huu and R. Goutarel (C.N.R.S., Gif-sur-Yvette) discuss the steroidal alkaloids of the Apocynaceae and Buxaceae.

Few typographical errors were detected; however, it was refreshing to learn that coniine could be obtained by reductive amination (p 52)!

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Polyamines in Normal and Neoplastic Growth. Edited by Diane H. Russell. Raven Press, New York, N. Y. 1973. xii + 429 pp. \$21.50.

"Polyamines in Normal and Neoplastic Growth" is a collection of articles from talks presented at a National Cancer Institute Symposium which covers a wide range of subjects under the broad theme of the involvement of polyamines in cell growth. The physiological function of the polyamines has received little attention until recently when the amines were reported to be associated with RNA metabolism and were found to increase in neoplasms as well as in response to many stimuli which promote cellular growth. From these findings the idea evolved that the polyamines may be mediators of cell growth presumably functioning at a step preceding RNA synthesis.

The occurrence of polyamines in living organisms is widespread and several articles in this collection report normal levels of the amines in a variety of animals including eight phyla of marine invertebrates. The distribution of polyamines in several areas of human and rat brain is reported as well as levels in the whole brain of fish, roaches, and mice. Putrescine, spermidine, and spermine are all present in most tissues but the ratio of one amine to the others varies.

Biosynthesis and metabolism of the polyamines are dealt with in several chapters and the article by Williams-Ashman, *et al.*, serves as a good review of the subject. Other articles deal with regulation of ornithine decarboxylase and *S*-adenosyl-L-methionine decarboxylase activities and thus regulation of polyamine levels. One group reports that intraperitoneal injection of dibutyl cyclic AMP increases ornithine decarboxylase activity in rat liver. Further investigation of this effect would be quite useful since most workers associate elevated levels of cyclic AMP with inhibition of cellular growth and transformation.

Several chapters deal directly with the increase in polyamines observed in cell growth. Mutant cells with low levels of polyamines or cells treated with antibodies to polyamines have a slow growth rate which is accelerated when polyamine levels are in-

creased. There are reports, and confirmation of earlier reports, that many rapidly proliferating cells such as regenerating liver, lymphocytes treated with mitogens, developing granulomas, and neoplasms have elevated polyamine levels as well as increases in the enzymes which synthesize the polyamines. There is some controversy here as, contrary to most other findings, one group reports the increase in polyamines to occur after the increase in RNA synthesis.

The largest group of articles in this book deals with the multitude of effects polyamines have on nucleic acid metabolism. Polyamines are reported to stimulate production of a specific species of RNA in frog eggs and total RNA in *Drosophila* larvae. Several authors deal with the stimulation of RNA polymerase and the inhibition of ribonucleases by polyamines. Also, two chapters concerned with stimulation by polyamines of methylation of tRNA provide further circumstantial evidence that polyamines are related to tumor growth since tRNA isolated from tumors appears to be more highly methylated than tRNA from normal cells.

New analytical procedures as well as adaptations of older techniques (*e.g.*, gas chromatography, mass spectroscopy, and amino acid analysis) have been applied to the quantitation of polyamines. Studies with various techniques support the findings of Russell, *et al.*, that concentrations of polyamines are elevated in urine of patients with cancer and there is one report of elevated amine levels in the serum of patients. Furthermore, tumor resections and radiation treatment are shown to lower polyamine levels in urine. So, polyamine levels may prove to be not only a diagnostic tool for cancer but also a marker to determine efficacy of treatment. The problems associated with the possible clinical use of polyamine levels are thoroughly discussed by Schimpff, *et al.*

There are 33 articles in this text. As would be expected, there is a wide variation in quality and the collection could definitely have benefited from some topical organization as there is very little. However, the volume is well indexed which helps one locate particular information.

One of the most striking observations about the work reported in this volume is the large number of actions attributed to the polyamines. In fact, Leboy and Piester say in their article, "the effects of polyamines on such a myriad of biochemical reactions leads one to suspect either that they are at the heart of much of cell regulation or that our *in vitro* studies may bear little relationship to metabolic events within the cell." The research reported here should be stimulus to continue to try to resolve this problem.

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Sulfur in Organic and Inorganic Chemistry. Vol. II and III. Edited by Alexander Senning with 26 contributors. Marcel Dekker, New York, N. Y. 1972. Vol. II, xi + 360 pp. Vol. III, xii + 462 pp. 16 × 23.5 cm. \$33.00 each (\$27.00 subscription).

The explosive growth during the 1960's in research into all aspects of sulfur chemistry has been followed by the increasingly frequent publication of multiauthor, multidollar reviews of sulfur research from various points of view. The particular perspective of this three-volume series is to present "an integrated treatment ... across the traditional lines of inorganic, organic, physical-chemical, and biochemical aspects of sulfur chemistry." In view of the not insignificant price of each volume and the ambitious goal of the series, it would be hoped that each chapter would provide a current, critical, and complete account of present research efforts in areas of timely interest. Unfortunately, many of the 19 chapters in these two volumes fall short of these standards. Ranging in length from 6 to 171 pp and in number of references from 20 to 940, the chapters show the variability of quality too often associated with works of this type. While some authors have conscientiously incorporated references through 1971, others have covered the primary literature at best through 1967 with the consequence that some chapters are already 6 years out of date.

Volume II includes chapters on atomic sulfur chemistry (O. P. Strausz), diatomic species containing sulfur (B. Meyer, D. Jensen, and T. Oommen), bond energy terms (D. A. Johnson), sulfur oxyacids (M. Schmidt), metabolic pathways of organic sulfur compounds (G. A. Maw), the pharmacology and toxicology of inorganic sulfur compounds (B. Sörbo), the mass spectra of sulfur compounds (G. Schroll and S-O. Lawesson), mixed sulfur halides (F. Seel), commercially important sulfur compounds (R. Leclercq), and chromatographic techniques in sulfur chemistry (E. R. Cole and R. F. Bayfield). Volume III includes chapters on reactions of elemental sulfur with inorganic, organic, and metal-organic compounds (H. Schumann), inorganic and organic polysulfides (T. L. Pickering and A. V. Tobolsky), the quantum chemistry of sulfur compounds (J. Fabian), steric aspects of sulfur chemistry (P. H. Laur), nmr spectra of sulfur compounds (C. Brown), labeled sulfur compounds (E. Blasius, W. Neumann, and H. Wagner), thione-enethiol tautomerism (R. Mayer), the nomenclature of sulfur compounds (K. L. Loening), and the nucleophilicity of organic sulfur compounds (M. J. Janssen).

Clearly the best chapter in these two volumes, the book length (171 pp, 940 references) review of sulfur stereochemistry by P. H. Laur, is an invaluable source of information on bond lengths and angles for all classes of sulfur compounds and should be ready reference material for researchers. Also of considerable value as reference sources and as concise introductions to important areas of research are the chapters on quantum chemistry of sulfur (56 pp; very up-to-date with 588 references) and on bond energy terms (32 pp and 139 references). A useful inclusion in Vol. III is a chapter on nomenclature of sulfur, selenium, and tellurium compounds. Considering the often confused state of affairs in sulfur nomenclature, it is unfortunate that only 16 pp were devoted to this subject. Indeed, it would have been of value to circulate a preprint of this chapter to authors of other chapters in these volumes to avoid errors, such as naming $\text{HO}_2\text{CCOCH}_2\text{SO}_2\text{H}$ as β -sulfinylpyruvic acid (Vol. II, p 121) and compounds of the type RSSH as persulfides (Vol. II, p 133). The chapter on metabolic pathways of organic sulfur compounds provides a good introduction to this area and includes discussions of some chemically fascinating subjects (such as the *in vivo* conversion of methionine to ethylene). Unfortunately, only 10 of the 80 references in the chapter are to sources after 1966. The short (22 pp, 150 references)

pharmacology chapter, while essentially a tabulation of toxic properties of various inorganic sulfur compounds, is recommended reading for researchers working with sulfur, selenium, and tellurium compounds.

On the other hand, the chapter on mass spectrometry of sulfur compounds, a subject badly in need of a thorough current review, is of limited value since it fails to discuss a number of important classes of sulfur compounds, most notably, inorganic sulfur compounds, and fails to cover the post-1967 literature, referring readers instead to a 1969 review article by these same authors for more details. The chapter on nmr spectra of sulfur compounds, while doing a somewhat better job of covering the recent literature (186 references through 1969), curiously allots less than 2 pp to the nmr spectra of sulfoxides, a subject which has received wide attention by researchers. The lengthy chapter on chromatographic methods (103 pp with 310 references of which only 18 are post-1967) seems somewhat dated with its inclusion of some 48 tabulations of retention times, R_f values and related data, and lengthy discussion of color tests. Some of the material in this chapter dealing with vpc methods is misleading. Thus, the listing of di-*tert*-butyl sulfoxide as the most thermally stable of a series of dialkyl and diaryl sulfoxides (Vol. II, p 291) is clearly incompatible with pyrolysis studies [*cf. Chem. Ind. (London)*, 626 (1960) and *J. Amer. Chem. Soc.*, 89, 718 (1967)], and the statement that thiolsulfonates may not be amenable to gas chromatography (p 297) is false [*cf. J. Org. Chem.*, 31, 3587 (1966)]. A particularly disappointing chapter is the one dealing with commercially important sulfur compounds (15 pp, 20 references). While occasionally informative, this chapter is marred by poor grammar, sophomore chemistry ("p-dichlorobenzene possesses two chlorine atoms which are rather like arms extended toward a reaction"), and numerous errors or misstatement of facts.

These books should be part of the holdings of major reference libraries. However, in view of the high cost of these volumes, the highly specialized nature of many of the chapters, and the fact that most chapters are 4-6 years out of date, these volumes cannot be recommended for personal libraries.

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