taneous injections, at 4-week intervals, of 0.6 mg of test compound, dissolved in 0.2 mL of neutral olive oil, into the right flank. The animals were monitored weekly by palpation, beginning at the 90th day of the experiment. Animals were killed when they had developed large tumors or at the end of the experiment, at an age of 700–800 days.

All animals were autopsied, and tissues with macroscopically visible modifications were excised for histopathology. All tumors observed were fibrosarcomas at the site of injection. The incidence of other tumors was not significantly different from controls.

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Registry No. **1a**, 3340-94-1; **2a**, 3340-93-0; **3**, 76527-89-4; **4**, 83876-50-0; **5**, 83876-51-1; **6a**, 83876-52-2; **6b**, 83876-53-3; **6c**, 83876-54-4; **7a**, 83876-55-5; **7b**, 83876-56-6; **7c**, 83897-14-7; **7d**, 83876-57-7; **7e**, 83876-58-8; **7f**, 83876-59-9; **7g**, 83876-60-2; **7h**, 83876-61-3; **7i**, 83876-62-4; 5-methyl-1-tetralone, 33892-75-0; 6-methoxy-1-tetralone, 1078-19-9; 7-methoxy-1-tetralone, 6836-19-7; 2-aminoacetophenone hydrochloride, 5468-37-1.

Book Reviews

Progress in Clinical and Biological Research. Volume 71. Psychopharmacology of Clonidine. Edited by Harbans Lal and Stuart Fielding. Alan R. Liss, Inc., New York. 1981. xii + 322 pp. 15.5 × 23.5 cm. ISBN 0-8451-0071-8. $52.00.

This book is a monograph based on a symposium organized by the American Societies for Experimental Biology, held at Anaheim, CA, in April 1980. The symposium focused on the psychopharmacology of clonidine. The book, then, is a compilation of various contributions on the pharmacology of clonidine. In fact, the first third of the book covers recapitulations of the anatomical, biochemical, and pharmacological relations between clonidine and the α receptors in the cardiovascular field. The contribution of Hoefke and Jennewein has the merit of shedding historical light on discussions of the pharmacology of clonidine. Therefore, it is only the second part of this work that really concerns the psychopharmacological properties of clonidine, but even here we encounter neurological data (pains, Korsakoffs' syndrome, etc.).

The review of Lal and Shearman is a timely reminder of the effects of clonidine on most of the classical pharmacological tests; the authors note in particular the sedative, anxiolytic, and antinociceptive effects, the decrease in food intake, and the aggressive behavior triggered off by clonidine. They suggest the therapeutic use of clonidine in particular as an analgesic, in withdrawal symptoms treatment of alcoholism with dementia and anxiety, schizophrenia, and depression.

The following chapters illustrate these various points, insisting, furthermore, on the usefulness of clonidine in the opiate withdrawal syndrome where it is now recognized both pharmacologically and therapeutically. The presumed action mechanism behind this effect is widely discussed in several contributions.

Malik states that clonidine does not always have an antidepressive effect on man.

All in all, this book gives a very interesting, albeit somewhat disparate, glimpse of the various pharmacological properties of clonidine. Certain contributions set out to review some aspects of this pharmacology, which is quite useful. Finally, the interest of clonidine and its action mechanism in the opiate-withdrawal syndrome are largely dealt with, which is by no means the least interesting aspect of the work.

Institut de Pharmacologie **Pascal Bousquet**
Faculté de Médecine
67000 Strasbourg, France

American Chemical Society Symposium Series. Number 174. *N*-Nitroso Compounds. Edited by R. A. Scanlan and S. R. Tannenbaum. American Chemical Society, Washington, DC. 1981. ix + 400 pp. 15.5 × 23.5 cm. ISBN 0-8412-0667-8. $39.95.

It is now an old joke that *N*-nitroso compounds are potent environmental carcinogens in search of the human cancer they cause. This book admirably reveals why, in spite of the considerable amount of effort put into the study of *N*-nitroso compounds, their role in causing human cancer is still uncertain. Reliable identification and assay of *N*-nitroso compounds down to 0.1 ppb levels in complex biological material is difficult, and much previously published work is of dubious value. The situation with reference to induction of human cancer is complex. In the past, attempts have been made to relate simply total nitrosamine exposure to human cancer, while it is now known that a variety of factors are involved and also that it is not necessarily those nitrosamines present in highest concentrations in the environment that are relevant to the cancer under consideration. Now that the chemical and biological complexities are beginning to be appreciated, an up-to-date book on the subject by workers in the field is especially timely.

The book is an account of the proceedings of the Symposium on *N*-Nitroso Compounds held at the 181st meeting of the American Chemical Society in March 1981 and cosponsored by the Divisions of Agricultural and Food Chemistry and Pesticide Chemistry. It is therefore not unreasonable that, with two exceptions, the 26 presentations describe work carried out in North America or Canada. The papers are well written and provide a pleasing number of formulas, tables, and references. In spite of the fact that the presentations have been published as provided by the authors in "camera-ready" form, there is a good uniform attractive layout.

The book is comprised of three sections. The first relates to the chemistry and metabolism of *N*-nitroso compounds and reveals the still very limited state of understanding of the subject. Thus, while it is generally accepted that α-hydroxylation is a route of metabolism of dimethylnitrosamine, there are large inexplicable interlaboratory differences in estimations of the extent to which α-hydroxylation occurs (Michejda). Papers on metabolism of dipropylnitrosamine (Archer) and of certain cyclic nitrosamines (Hecht) are good accounts of work done, but possible carcinogenic DNA adducts have not yet been identified.

The second and major section of the book discusses the chemistry of formation of *N*-nitroso compounds and factors that block their formation. *N*-Nitroso compounds are formed inadvertently in industry, as discussed for the pesticide (Keefer) and rubber and leather tanning (Fine) industries, in the production beer (Mangino) and of tobacco products (Hoffmann), and in many foods, where ever amines and nitrite comes together under suitable conditions (Gray), in vivo, as in gastric juice (Mergens) and from herbicides in the soil (Khan). The role of bacteria seems to be related to reduction of pH and conversion of nitrate to nitrite rather than to direct catalytic formation of nitrosamines (Ralt). Most important of all is the excellent discussion on the main objective of the whole enterprise, how to reduce human exposure to nitrosamines (Preussmann). It is this application of the work that is very probably reducing the incidence of human cancer at the present time and very amply compensates for slow progress in other areas.

The third section of the book relates to the analysis and oc-

currence of *N*-nitroso compounds. A thoughtful discussion of analytical methods emphasizes the need to reevaluate the possible artifactual formation of nitrosamines with each type of sample (Issenberg). Assessment of the role of nitrosamines in human cancer is limited to two good presentations (Weisburger, Correa), which illustrate the complexity of the problem. Admirable detective work has shown that gastric cancer is likely to occur not simply where there is a high level of nitrate in the diet but also where there is simultaneously a low consumption of fresh fruit and vegetables (and therefore of vitamin C, a compound that tends to inhibit nitrosamine formation) and also a high intake of pickled vegetables and fish, the salt diet acting as an irritant on the gastric mucosa.

I highly recommend this book to workers in this area and also to those who apparently consider the elucidation of the causes of human cancer to be a simple problem that should be rapidly solved.

Toxicology Unit **Valda M. Craddock**
Medical Research Council
Laboratories
Carshalton, England

Ion Exchange and Solvent Extraction. Volume 8. Edited by J. A. Marinsky and Y. Marcus. Marcel Dekker, New York. 1981. xi + 438 pp. 16 × 23.5 cm. ISBN 0-8247-133-8. $55.00.

This is the latest addition to the Marcel Dekker series dealing with various aspects of ion exchange and/or solvent extraction and should prove of interest to scientists and engineers in the areas of analytical chemistry, processing chemistry, radiochemistry, hydrometallurgy, coordination chemistry, and the purification and separation of organic, inorganic, and/or biochemicals. This particular volume deals exclusively with solvent extraction topics, with an apparent emphasis in parts on applications to metal derivatives. There are five separate chapters to this volume, several dealing with more practical aspects of solvent extractions, and the others with more theoretical principles. Thus, the first chapter deals with the use of hydroxyoxime-type resins for the extraction of various metals and their derivatives, while chapter 3 emphasizes the use of solvent-impregnated resins for analogous type extractions. Chapter 4 deals with the use of solvent extraction for elements of the platinum group and emphasizes individual solvent extraction systems of use and importance for this class of metals.

The remaining two chapters deal with more general areas of solvent extraction: chapter 2 deals with electrical phenomena in solvent extraction and the last chapter covers solvent extraction from aqueous–organic media as opposed to organic extractions from purely aqueous media. This last chapter is of interest because it approaches a problem that has confounded and confused many workers in this field, requiring a knowledge of various organic solvents compatible with an aqueous–organic sample media. In general, all of the contributed chapters are well written, there are quite extensive lists of up-to-date references from the literature, and the authors are obviously well versed in their respective areas of interest.

Those readers who have found previous volumes in this series of interest, of use, and of direct application to their own problems should find this latest volume equally as valuable. There is little question but that each chapter here is the latest definitive word in that area of solvent extraction and that anyone involved and/or interested in such topics would be well advised to follow this series carefully.

Institute of Chemical Analysis **Ira S. Krull**
Northeastern University
Boston, Massachusetts 02115

B_{12}. Volume 1. Chemistry. Volume 2. Biochemistry and Medicine. Edited by David Dolphin. Wiley, New York. 1982. Vol. 1: xiv + 671 pp. Vol. 2: xiv + 505 pp. 16.5 × 24 cm. ISBN 0-471-03655-2 (set). $130.00 per set.

B_{12}, or more appropriately vitamin B_{12}, is a two-volume set designed to bring together "for the first time, a complete and comprehensive review of all of the major chemical, biochemical, and medical aspects of this vitamin." Except for the ill-chosen title, which goes against the recommendations of the IUPAC–IUB Commission on Biochemical Nomenclature (see Vol. 1, p 20) and will undoubtedly cause confusion in library cataloguing, the work has hit close to the mark. The editor has enlisted an impressive group of authors, some of which are mentioned below. The first volume is devoted to chemistry and contains 15 chapters, beginning with a brief history by K. Folkers, a leader of a group that isolated crystalline cyanocobalamine, followed by a chapter on nomenclature. X-ray studies of vitamin B_{12} as well as its coenzymes and analogues are lucidly presented by J. P. Glusker with excellent illustrations that will be appreciated by both the expert and the serious student. The biosynthesis of the corrin macrocycle by A. R. Battersby and E. McDonald, as well as the cobalamin coenzymes by F. M. Huennekens et al., is timely and brings together into a neat package results that are, in the most part, still in the primary literature. The chapter on the Eschenmoser–Woodward synthesis of the vitamin, undertaken graciously by R. V. Stevens after the untimely death of Professor Woodward and the overburdening of Professor Eschenmoser, provides a useful summary and is without references. Besides sections on the electronic, EPR, and NMR (proton and carbon) spectra, the volume also includes the synthesis of organocobalt complexes, reactions of the corrin ring and of the alkyl ligands coordinated to cobalamines and cobaloximes, the coordination chemistry of the isomerase reactions, and the study of model systems of vitamin B_{12} and its coenzymes. The second volume continues with 14 chapters on biochemistry, in the main, and medicine. The topics reviewed involve biological sources, transport in microorganisms and in man, for which the binding proteins, intrinsic factor, transcobalamin, and haptocorrin are discussed as to purification, structure, and properties. There are sections on assay methods and metal-free corrinoids (the most recently discovered vitamin B_{12} analogues). The remainder of the chapters are devoted individually to enzyme reactions that require cobalamine coenzymes, such as amino mutase, diol dehydrase, ethanolamine ammonia-lyase, glutamate mutase, ribonnucleotide reductases, and so on. Each is given a full treatment, including purification, properties, assay, and mechanisms.

These volumes should be in every library and in the possession of investigators in the field. The student and researcher will find a wealth of information and ample citations to the original reports, some to 1980 and in a few cases to 1981. The editor and authors are to be congratulated for an excellent set that will be of value for many years, as well as the publisher for clearly illustrated and pleasing to read pages. The indexes, both author and subject, appear complete and reliable.

Division of Medicinal Chemistry **Raymond W. Doskotch**
and Pharmacognosy
College of Pharmacy
The Ohio State University
Columbus, Ohio 43210

Chromatographic Science Series. Volume 20. Biological/Biomedical Applications of Liquid Chromatography IV. Edited by Gerald L. Hawk. Marcel Dekker, New York and Basel. 1982. ISBN 0-8247-1842-0. xv + 367 pp. 16 × 23.5 cm. $55.00.

The field of high-performance liquid chromatography has developed extremely rapidly in the recent years. Improved column packing materials and highly developed instruments now allow good and fast separation of almost any organic compound; it therefore has become today probably the most versatile and widely used separation technique available.

This volume is a collection of carefully prepared papers arising from the 4th International Liquid Chromatography Symposium held in Amsterdam in April 1981. The 25 articles cover a broad spectrum of examples on applications in high-performance liquid chromatography and related techniques for clinical routine analysis, toxicology, and food analysis. It includes methods for the purification and determination of peptides and proteins, as well as applications for the analysis of a variety of drugs, such as antidepressants, anticonvulsants, benzodiazepines, and ceph-

alosporine antibiotics. Four papers describe methods for determination of catecholamines and indolamines, two of them using a highly sensitive amperometric detector, which has attained great popularity in recent years. Finally, there are three excellent papers covering methods for the analysis of (16 different) food additives and compounds related to vitamin A and D, respectively.

The book does not aim to give introduction to liquid chromatography or detailed theoretical background to these techniques (this has been done by several textbooks or review articles already). However, it will be of greatest value for the more advanced worker who is involved in developing or adapting high-performance liquid chromatography methods for any organic compound or group of compounds. He will find this book to be an abundant source for practical advice on many technical or analytical problems he will have to face during his work.

Faculty of Medicine **Günther Sperk**
Institute of Biochemical Pharmacology
University of Vienna
Vienna, Austria

Medicinal Uses of Plants by the Indian Tribes of Nevada. By Percy Train, James R. Henrichs, and W. Andrew Archer. Quarterman Publications, Lawrence, MA. 1982. 139 pp. 16 × 23.5 cm. ISBN 0-88000-109-7. $25.00.

This is but a small sample of the medical lore of the North American Indian, much of which is still to be found in relatively inaccessible anthropological, ethnobotanical, and museum reports in contrast to the familiar compilations of the medicinal plants and practices of the Central and South American Indians. Nostalgia buffs among the older medicinal natural-products chemists will enjoy it; it is a facsimile reproduction of an edition of 1957, which, in turn, was a revision of the original three-part compilation of 1941.

A map of the tribal areas of Nevada covered in the survey, a glossary of tribal plant names and descriptions, and summaries of the preparation and use of some 195 plant species are included. Of particular interest is a summary of the pharmacological research undertaken between 1939 and 1943 in an attempt to validate claims of medicinal usefulness of a number of these remedies, many of which seem to have been applied to the treatment of venereal disease, respiratory problems, and arthritis.

It is not likely that the reinvestigation of some of the species by more modern chemical and pharmacological techniques developed since the 1940's would uncover much more than the two plants that merited extensive study at the time (*Lithospermum ruderale, Larrea divaricata*), but obviously conclusions in this matter are best left to the reader.

Northeastern University **Robert F. Raffauf**
Boston, Massachusetts 02115

Books of Interest

Organic Chemistry: An Introduction. By J. E. Fernandez. Prentice Hall, Englewood Cliffs, NJ. 1981. xxii + 538 pp. 18 × 24 cm. $19.95.

Distance Geometry and Conformational Calculations. By G. M. Crippen. Wiley, New York. 1981. 58 pp. 18.5 × 28.5 cm. $26.25.

Ionophores and Their Structures. By Max Dobler. Wiley, New York. 1981. xi + 379 pp. 16.5 × 24 cm. $57.50.

The Alkaloids. Volume 10. Specialist Periodical Reports. M. F. Grundon, Senior Reporter. Royal Society of Chemistry, London. 1982. xii + 263 pp. 14 × 22 cm. $104.00.

Principles of Biochemistry. By Albert Lehninger. Worth Publishers, New York. 1982. xxiv + 1011 pp. 21 × 26 cm. $31.95.

Glossary of Chemical Terms. Second Edition. By C. Hampel and G. Hawley. Van Nostrand Reinhold, New York. 1982. ix + 306 pp. 15.5 × 23 cm. $19.95 (cloth).

Methods of Biochemical Analysis. Volume 28. Edited by David Glick. Wiley, New York. 1982. viii + 430 pp. 15.5 × 23.5 cm. $45.00.

Kirk-Othmer Encyclopedia of Chemical Technology. Third Edition. Volume 18. Edited by Martin Grayson and David Eckroth. Wiley, New York. 1982. xxvi + 950 pp. 18.5 × 26 cm. $165.00.