NEW BOOKS

STABLE RADICALS by Anatolii L. Buchachenko (Consultants Bureau, New York, 180 p., 1965, $15).

The author of this book sets as his goal the description and classification of types of stable radicals and the discussion of their physical and chemical properties. This is an intriguing and important area of chemistry which had not previously been reviewed, and this book is a welcome addition to the literature.

Much of the information on these stable radicals is obtained by use of the electron paramagnetic resonance (epr) technique, and the first chapter provides a description of epr. This chapter is only 25 pages long, and therefore represents only the briefest introduction. Nevertheless, this is a good, though elementary, summary of the field.

Chapters 2, 3, and 4 treat radicals with the odd electron centered on carbon, oxygen, and nitrogen, respectively. The epr spectra of a large number of radicals of these classes are given and discussed. Frequently some features of the chemical reactivity of the radicals are also covered. These three chapters, 100 pages in length, are the heart of the book. As such, the book is primarily a catalogue of epr spectra of various stable radicals with emphasis on the Russian literature of the period 1950–1963 (see below).

Chapter 5 treats some of the electrical properties of radicals both in solution and in the solid phase. Chapter 6 covers a number of chemical reactions of the stable radicals discussed in the previous chapters. This chapter, 25 pages long, represents a useful but brief review.

The book contains a relatively small number of outright errors (for example, on pages 15, 108, 111, 123, and 173). Frequently, however, the translation is stilted with unusual word usage (for example, pages 96 and 163).

One of the book's chief strengths is also a weakness: Russian work is cited almost to the exclusion of American and English work. As such, the book represents a valuable and welcome guide to the Russian literature, but a somewhat limited review of the area in general. The American work, when used, is sometimes incorrectly cited.

Rate constants are converted from the units used in the original works into cc molecule^{-1} sec^{-1} (which is stated in the text as cm^3/sec). This conversion is not always correctly made, as for example, in the work of Weissman and Kreilick cited on page 96. It seems unfortunate that the author converted data in solution in liter mole^{-1} sec^{-1} to the less familiar unit he chooses.

My strongest objection to the book is that no indexes are included. A subject index would have made the book vastly more useful, and it is unfortunate that the translator did not construct one himself if there was none

included in the Russian edition. The lack of an index is particularly damaging since the author does not normally cross-reference topics within the text itself.

The book somewhat lacks in currentness: The English language literature is covered through 1962 and the Russian through early 1963. This lack is understandable in a translated work such as this one.

This book compares in level of sophistication and in currency with the review by M. C. R. Symons in "Advances in Physical Organic Chemistry," Vol. 1. The Symons article is also almost the same length as this book, and, as such, the "Advances" volume represents a better buy. Buchachenko's viewpoint, however, is more that of an organic chemist, and he discusses far more spectra of stable organic radicals than does Symons.

W. A. Pryor
Department of Chemistry
Louisiana State University
Baton Rouge, Louisiana

Current Trends in the Alkaline Neutralization of Edible Oils, by P. J. Seip, (Rotterdam Press, 1965, 154 p., no price listed).

The book is paper bound and of good quality. It is easy to read and the number of errors are not significant. While the book contains no index, the table of contents is quite satisfactory. The seven chapters in the book are clearly outlined in the table of contents and cover the following subjects: Chapter I is the introduction; Chapter II is a survey of the literature on the neutralization process; Chapter III, development of a new neutralization method; Chapter IV, the occurrence of soap in neutralized oil; Chapter V, the neutralization process considered as extraction process; Chapter VI, investigations into the mechanism of the neutralization process; and Chapter VII, a summary. This book can be described essentially as a thesis on a very large amount of new work carried out by the author.

In Chapters I and II, after describing the nature of the refining or neutralization process for commercial oils, the author considers the many ways in which the neutralization procedure is normally carried out and gives a description of a well-neutralized oil.

The following chapters deal largely with a description of a concurrent or countercurrent process in which the neutralization is carried out by a liquid-liquid nonagitated contiguous flow of unrefined oil and dilute caustic. This new process is investigated as to temperature, relative volumes and flows of oil and caustic, the nature of the caustic and the nature of the oil involved. It is determined that this process will not yield by itself a refined oil sufficiently low in fatty acid to be defined as fully refined. However, the process does produce low losses and, coupled with a standard refining procedure to remove the final free fatty acid, will give an overall loss lower than the standard procedure starting with the same free fatty acid.

The effect of temperature, type and concentration of caustic solution used, the effect of added electrolite and the effect of the kind of fatty acid involved has been studied with reference to the free fatty acid of the refined oil and the loss of neutral oil in the process. These studies have been quite thorough and meticulous.

This book will be of considerable interest to anyone dealing with the refining of edible and inedible oils, since it not only gives a large amount of experimental data, but discusses the theory of the neutralization process.

R. C. Stillman
Ivorydale Technical Center
Procter and Gamble Co.
Cincinnati, Ohio

Thin Layer Chromatography, A Practical Laboratory Handbook by A. A. Akhrem and A. I. Kuznetsova, Academy of Sciences of the U.S.S.R., Zelinskii Institute of Organic Chemistry (Daniel Davey and Inc., 120 p., 1965, $8.75)

The book is cloth bound, 6½ × 9½ in., translated from the Russian, printed, bound in Israel under the auspices of the Israel Program for Scientific Translations, Ltd. It consists of two divisions, a "General Part" and a "Special Part." The former is a discussion of the principles of thin-layer chromatography, a description of preparation of thin-layer plates, and descriptions of methodology in qualitative and quantitative analysis. The latter is a cataloging and listing, by groups, of a wide variety of components that have been separated using thin-layer chromatography techniques. Seventy-two pages are devoted to this part.

An appendix lists and gives the composition of 42 spray reagents. Two hundred eighty-two references and a subject index comprise the last 11 pages of the book.

The authors state in the preface that the purpose of the book is to assist the investigator in familiarizing himself with the possibilities of thin layer chromatography, and to help him to apply the methods in his work. The authors accomplish this purpose, but the book has the drawback, in comparison with several other available books on the subject, of brevity. For example, the discussion of principles of absorption chromatography is treated rather superficially, and therefore, the book cannot be considered as a textbook, contrary to the authors' suggestion. The portion dealing with preparative techniques for several types of chromatography, including a description of preparation of adsorbents, is perhaps the most useful part of the book. The descriptions of techniques are such that occasionally it is difficult to obtain a visual image of how a procedure can be carried out,

however, and for this reason, the book may not be completely practical for one who has never seen thin-layer chromatography in use.

The major portion of the book, which describes separations of various types of compounds, can be a great time-saver for the investigator, in that it introduces him to the literature. It often does not provide sufficient information to enable him to go into the laboratory and begin work, however. This portion of the volume is at times reminiscent of a review article, describing only what has been done in the case of certain types of separations.

In some cases, information suffers from being out of date. For example, methods which are described for the separation of glycerides have been greatly improved upon. Some separations (fatty acids) are described as though the process is simple and reliable, whereas the experience of many workers is to the contrary.

While a rather good description of compositions of a variety of absorbents is given in the "General Part" of the book, description of the applications given in the "Special Part" often fails to describe adequately the types of absorbent used. Thus it is difficult for the reader to refer to descriptions of adsorbents that are given in the "General Part," and hence to use the information that is available. In this sense the book cannot be considered as a laboratory manual.

It does have value for one who wishes an introduction to the field. If one has been in the field for some time, and has acquainted himself with the literature describing techniques that are of particular concern to him, however, its use may be somewhat less. Its cost is not sufficiently great to keep it off the bookshelf of the investigator, and as a reference manual it may easily save him much more than its cost, in terms of time saved.

R. M. JOHNSON
College of Biological Sciences
Ohio State University
Columbus, Ohio

ADVANCES IN MAGNETIC RESONANCE, VOL. I, J. S. Waugh, editor (Academic Press, New York, 413 p., 1965, $15).

"It is . . . with the insiders as well as the interested outsiders in mind that this serial publication was conceived." Thus the editor, Prof. J. S. Waugh, indicates the objective of this new series. The book is devoted to high resolution proton magnetic resonance (PMR) and to a lesser extent to electron spin resonance (ESR). Within this limitation Volume I is a good beginning to the series. The subjects of the articles range from theoretical contributions through reviews of chemical applications to the compilation of experimental results.

Within clearly defined limits A. G. Redfield presents an excellent discussion of relaxation phenomena and his own theory of relaxation processes. He begins by setting his theory in an historical perspective, referring to many original works, and by correlating his theory with those of other workers. He reviews the basic equations of other theories and explains those of his own theory. He concludes with a brief discussion of applications. Redfield has succeeded in putting the outsider in mind with the insiders.

Michael Barfield and D. M. Grant present a state of the art exposition on the theory of electron-coupled proton spin-spin interactions. They briefly review the various theoretical models which have been tried, pointing out the general successes and failures of each. Where they have used the acronyms of quantum mechanics, they have included their meanings for the benefit of the outsider. The sum of their effort is a thoroughly readable account of the theory of spin-spin coupling. Even those merely acquainted with quantum mechanics can ready this without referring to other sources.

C. S. Johnson, Jr., reviews the application of magnetic resonance (i.e., PMR and ESR) to the study of chemical rate processes. Theoretical developments are presented more or less chronologically. Next he discusses the determination of reaction rates from slow passage experiments. His lucid description gives one a panoramic view of the solution of kinetic problems with the aid of magnetic resonance. Finally he reviews the more recent transient methods.

D. R. Eaton and W. D. Phillips discuss the elucidation of geometrical and electronic structures of paramagnetic molecules and complex ions. They limit themselves to discussing contact interactions between nuclei and unpaired electrons and to paramagnetic relaxation. The relevant theoretical background is quickly reviewed. The remainder of the article is given over to a survey of applications which seem largely to coincide with their own interests in paramagnetic organic compounds. They proceed case by case to discuss the results obtained with various compounds. For anyone about to search the literature regarding the work reviewed, Eaton and Phillips have provided a good point of departure.

The two concluding articles are compilations of experimental results. A. A. Bothner-By has compiled geminal and vicinal proton-proton coupling constants of organic compounds. He admits that the application of his criteria for the noninclusion of values resulted in a very large rejection rate on the order of 90% of the relevant literature. Such extensive exclusion does seem rather unnecessary and restricts the usefulness of the compilation. A good resumé of background information on various classes of compounds precedes the 37 tables of coupling constants, occupying 100 pages. A given entry in the table consists of the structural formula (but not the

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name) of the compounds, the value of the coupling constant and references to the bibliography. The known signs of the coupling constants are given. The readability of the tables would have been enhanced had greater attention to detail been given to their preparation and printing. Witness the fact that arrows are used in conjunction with some of the structural formulas to indicate the protons in question. However, in the other entries the protons in question are not always immediately obvious. Moreover, there are a few typographical errors, some ambiguous structural formulas and an instance or two where an entry is included in the wrong table. The large rejection rate and the minor errors detract from an otherwise useful endeavor.

K. W. Bowers saw no need to add to the list of recent reviews of ESR and so is content with a few brief comments and a compilation of "published hyperfine splitting of radical ions in solution." Apparently the sole criteria of inclusion of a splitting constant value in the table was its appearance in the literature. Preceding the "Table of Splitting Constants of Radical Ions" is a brief mention of its contents and of the abbreviations used. A given entry in the table includes the empirical formula with the sign of the ionic charge, the structural formula, the name of the compound, the value(s) of the splitting constant(s), the name of the solvent and references to the bibliography. The nearly 300 entries occupying 70 pages are arranged sequentially according to empirical formula. Bowers has used two different conventions in drawing the structures of aromatic ring systems. Aromaticity is indicated sometimes by the traditional convention of alternating double bonds and sometimes by a capital "O" in the center of the benzene ring. The use of a single convention, preferably the traditional one, is desirable, especially since the "O" is occasionally confusing, being also the symbol for an oxygen atom. It is unfortunate that these rather minor flaws have been permitted to detract from a useful compilation.

Naturally the greater the reader's prior knowledge of magnetic resonance the greater will be his comprehension of the articles. Nevertheless other readers including graduate students can benefit from a perusal of them. Oil chemists will find the compilation by Bothner-By and the article by Johnson of greatest interest.

J. M. Purcell
Eastern Utilization Research and Development Division
ARS, USDA
Philadelphia, Pennsylvania

Developments in Applied Spectroscopy, Vol. 4, Proceedings of the Fifteenth Annual Mid-America Spectroscopy Symposium, ed. by Elwin N. Davis (Plenum Press, 546 p, 1965, $18.50).

This volume presents 45 papers given at the Symposium, distributed as follows: X-ray Spectroscopy, 9; Infrared and Raman, 8; UV and Visible, 4; Gas Chromatography, 11; NMR, 1; Emission, Flame and Atomic Absorption, 12. The method of selection of the 45 papers from the 115 given is not indicated.

The book is subject to some of the same comments that would be pertinent to a discussion of the Symposium. Most of the papers presented are of no specific interest to a reader, and the few that are of interest tend to be narrow. As a source of general information to nonattendees of the Symposium, the collection of papers has less value than the personal contacts which are likely to be the usual reasons for attendance.

It is doubtful that this book should appear on the shelves of any but the most devoted collectors of papers.

R. O. Crisler
The Procter & Gamble Company
Ivorydale Technical Center
Cincinnati, Ohio

PROGRESS IN THE CHEMISTRY OF FATS AND OTHER LIPIDS, VOL. VIII, PART 3 (Chromatography), R. T. Holman, editor (Pergamon Press, 420 p., 1966, $6.50).

This book consists of three independent review articles. The first, entitled "Recent Developments in the Thin-Layer Chromatography of Lipids," by D. C. Malins, comprises about half the book. The subjects under discussion are classified according to the principle involved in the separation namely; Adsorption Chromatography, Partition Chromatography, Reversed-Phase Partition Chromatography, Chromatography on Layers Containing Complexing Agents, Preparative Thin-Layer Chromatography and Quantitative Techniques. Under these titles, further classification is done on the basis of the chemical nature of the substances to be chromatographed. In most of these sections, a brief discussion on the mechanism of the separation is followed by a description of the procedure and a list of applications. The inclusion of 211 references covering publications up to and including 1965 and an easy access to the subjects (in spite of the lack of an index) make this review extremely valuable for those working on the fractionation of lipids. Numerous figures and diagrams of good quality supplement the text very aptly.

The second article is by J. G. Hamilton and is entitled "Paper Chromatography of Lipids." It is a very short (about 10 pages) review of the application of paper chromatography to the separation and analysis of the different lipid classes. Brief comments on quantitative paper chromatography and a discussion of practical matters are also included.

The third article in the book entitled "Column Chromatography of Lipids" is written by R. A. Stein and V. Slawson. This article and its 236 references provide considerable information on the different types of column chromatography (adsorption, partition, ion exchange, etc.) including experimental details and applications. The authors have made an effort to explain, on a physicochemical basis, the mechanism of most of the processes or reactions they mention. This approach is sound, but in the present case is hampered by the use of language which is pompous and not of the best quality. The following sentence serves as an example: "Because of the dissimilarity in structure, polarity, solubility and bonding tendencies, it has been pointed out that no systematic relationship between separability of various molecular structures has been demonstrated" (p. 393). In addition, a more careful editing might have prevented expressions such as "aqueous organic solvents" (p. 386), "excessive overloads" (p. 394), and "dissolving solvent" (p. 398).

As a whole, the book provides valuable practical information for those involved in the fractionation and analysis of lipids, with a special accent on lipids of biochemical interest. Some overlapping of the topics discussed in the three parts seems to be unavoidable, and up to a point, desirable, since at times it provides differing personal opinions on similar matters.

This new volume of the series has been printed more carefully than the previous ones. For example, the reference system is similar throughout the book, the type is larger, and the time involved in publication seems to have been shortened. For the next volume of the series the editor will have to decide whether to use the British or the American spelling of some words, to avoid cases such as the use of "colour" on page 340 and "color" on page 393. The book has no index.

N. R. BOTTINO
Department of Biochemistry & Biophysics
Texas A&M University
College Station, Texas

PAINT FLOW AND PIGMENT DISPERSION, by T. C. Patton (Interscience Publishers, 479 p., 1964, $16.50).

Apparently intended as a practical tool of everyday usefulness, this book approaches fundamental concepts of coating performance in a practical way. Although not neglecting the theoretical and mathematical, the book pays considerable attention to the practical problems facing the coating technologist.

Viscosity is defined and described, and ways of measuring it are detailed. Effects of temperature, solvents, and resin properties on viscosity are described in considerable detail. The relationship of brushing, leveling, sagging, settling, etc., to viscosity and flow is given considerable attention.

The detailed treatment given viscosity is also afforded pigment dispersion theory, practical mixing and grinding equipment, solvency, letdown techniques, film applicators, flooding, floating, and other common film defects.

Liberal use is also made of graphs, charts, equations, and over 100 solved problems which aid the reader in grasping the ideas presented more quickly and fully.

Persons involved in formulation of resins and coatings, as well as manufacturing, probably know or have a habitual awareness of much of the information given in this book. However, the clarity with which the ideas are presented and the gathering into one reasonable body the many related concepts provide a new clarity and insight into many familiar everyday problems.

An appendix giving considerable data on common solvents is included.

J. F. ROTHERMEL, JR.
The Sherwin-Williams Company
Garland, Texas

SPECTROSCOPY IN EDUCATION. VOL. 2, SPECTROSCOPIC TECHNIQUES IN ORGANIC CHEMISTRY, by A. J. Baker and T. Cairns (Heyden and Son Ltd., London, 1965 87 pp., $3.50).

The primary purpose of this book is to provide the graduating student or the practicing organic chemist with information on the use of spectroscopy in elucidating molecular structure. The book consists of four sections: infrared spectroscopy, NMR spectroscopy, mass spectrometry and ultraviolet spectroscopy. Each section begins with an introductory statement of the basis of the method, proceeds to experimental techniques and applications, correlation tables of important frequencies associated with the method, and mainly provides interpretations of a series of spectra. Diagrams for the four different types of instruments are presented.

The infrared section presents instructions for 12 laboratory experiments which include calibration of the instrument and its adaptation and use for different purposes. Spectra are presented and the data interpreted for eight compounds in the NMR section and for six compounds in the mass spectrometry section. In a discussion of the principles of mass spectrometry, examples are given to ilustrate the different fragmentation processes. The ultraviolet spectroscopy section presents rules of diene absorption; effects of -ynes and en-ynes; the carbonyl chromophore and enones; lactones, esters and amides; aromatic and heterocyclic compounds; finally, examples are given of spectra for six compounds which show effects of one group on another.

Those chemists who were not fortunate enough to receive such instruction in their college courses, but who need the help which can be provided by spectral measurements in their work, will find this book to be useful as an aid to understanding of the principles and interpreting the data, even though operation of the instrument may be performed by other, more specialized personnel.

A bibliography of text and reference books is provided in addition to references to original articles. The volume consists of 8½ × 11 inch pages printed (apparently multilithed) on one side only and fastened by a plastic ring binder. Legibility is good throughout the volume. It is part of a series of publications, of which Volume I is entitled "Spectroscopic Problems in Organic Chemistry."

F. W. QUACKENBUSH
Dept. of Biochemistry
Purdue University
Lafayette, Indiana

Two UCLA Programs in Gas Chromatography

Progress in Gas Chromatography

An Advanced Research Conference will highlight the week of March 20–24, 1967, devoted to gas chromatography at the University of California, Los Angeles. R. L. Pecsok, vice-chairman of the UCLA Chemistry Department, announced the "Progress in Gas Chromatography" program. On the two-day conference program for March 20 and 21 are: Fred Bauman, Varian Aerograph; Irving Bengelsdorf, Science Editor, Los Angeles Times; Nathaniel Brenner, Perkin-Elmer Corp.; W. D. Cooke, Cornell University; W. H. McFadden, USDA; D. M. Ottenstein, Johns-Manville Corp.; J. H. Purnell, University College, Swansea, Wales; and D. R. Rushneck, Barber-Colman Company. Lectures and Laboratory demonstrations will be conducted.

Principles of Gas Chromatography

The ninth short course in "Fundamental Principles of Gas Chromatography" will be held March 22–24. Its aim is primarily to instruct personnel from industry, although it may be equally valuable to persons in academic or government laboratories. The approach will be nonmathematical, using theory only to the extent necessary to understand the practical aspects and to obtain optimum results.

Fee for the two-day Conference will be $25, and for the three-day course $135. Additional information may be obtained by phoning or writing to H. L. Tallman, Physical Sciences Extension, 6532 Boelter Hall, University of California, Los Angeles, California 90024.

Sol Gershon Receives SCC Medal

S. D. GERSHON (1952), assistant director for development in the research and development division of Lever Brothers Company, was presented with the highest award of the Society of Cosmetic Chemists, the Medal of the Society, at its annual dinner-dance on Wednesday, November 30 at the Americana Hotel in New York City.

Dr. Gershon was honored for his outstanding contributions, both in academic life and industry, to the art and science of cosmetics and toiletries. William Mueller of the Toni Company, president of the Society, made the presentation.