

New Books

STRUCTURAL TRANSFORMATIONS IN GLASSES AT HIGH TEMPERATURES, edited by N. A. Toropov and E. A. Porai-Koshits (Consultants Bureau, New York, 223 pp., 1965, \$25).

The book comes in a hard cover, 8½ by 11 in., with clear type, excellent photomicrographs, numerous tables and diagrams but no author or subject index. The contents are of interest mainly to a manufacturer of ceramic glasses. The book is a translation of a Russian text which presents, in 21 papers, the results of investigations at the I. V. Grebenshchikov Institute of Silicate Chemistry of the Academy of Sciences of the USSR to produce high-strength and heat-resistant glasses. The theoretical papers are concerned with the primary stages of the formation and development of heterogeneous structures during heat treatment, and the relation between structure and mechanical properties of glasses with various compositions. The structures are examined by electron microscopy and small-angle X-ray scattering. One paper discusses the electronic structure and flexibility of Si-O-Si and P-O-P bonds and suggests that silicates with the elasticity of polymers are possible. Many references are given but almost exclusively to Russian texts and journals.

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RADIATIVE HEAT EXCHANGE IN THE ATMOSPHERE, by K. Ya. Kondrat'yev, Professor of Atmospheric Physics, University of Leningrad (Published by Pergamon Press, 411 pp., 1965, price \$15).

This is a hardback, well-bound volume, consisting of eight chapters. The chapter titles are both descriptive and appropriate. Each chapter contains several major subtitles as well as numerous minor subheadings which aid the reader in locating specific information quickly.

This volume, the first English edition, has been revised and enlarged considerably from the original Russian volume entitled, *Radiant Energy of the Sun*, published by Gidrometeoizdat, Leningrad, in 1954. The translation by O. Tedder, as well as the editing of the translation by D. C. Walshaw, is a masterful job. The resulting text, even though very technical, is very explicit in comparison to volumes in English covering the same general subject.

The central theme in this volume is that of terrestrial thermal radiation transfer within the earth's atmosphere and at the earth's surface. The author

sets forth the basic physical laws, definitions, and concepts primarily in the first chapter. The second chapter is concerned with the problems of measurement. Chapters three and four are primarily concerned with the absorption and transfer of terrestrial radiation within the earth's atmosphere. The author's treatment of the subject-matter in these two chapters is an eloquent one. In chapter five, the author mainly concerns himself with the problem of calculating "effective-outgoing-radiation." The many facets of computing "net radiation" are taken up at length in chapters six, seven, and eight.

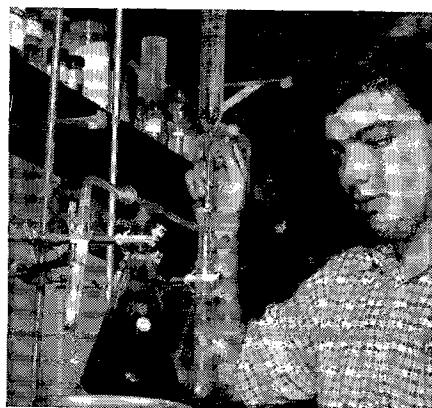
This reviewer would not consider the material covered in the earlier chapters of this volume superior to or greatly different from the treatment of essentially the same subject-matter in several other volumes originating within the English language. However, some of the data values and discussion in the late chapters do not appear in any existing volume in English, at least to the knowledge of this reviewer.

The reviewer cannot compare this volume with other listings within the author's rather extensive Russian bibliography. Comparison can be made with another Russian author covering a similar subject.

M. I. Budyko's volume entitled, *The Heat Balance of the Earth's Surface*, also published by Gidrometeoizdat, Leningrad, 1956, and translated by Office of Technical Services, in 1958. While the two authors are primarily concerned with the net energy concept, Professor Kondrat'yev's treatment covers thermal radiant transfer in both the atmosphere and at the earth's surface. However, the subject-matter covered in Budyko's monograph primarily deals with matters pertaining to the earth's surface. Also, Professor Kondrat'yev's treatment is confined almost entirely to terrestrial thermal radiation transfer while Budyko discusses other facets of net energy transfer, including turbulent heat exchange and latent heat exchanges which are primarily confined to the terrestrial surface.

This volume is definitely directed toward a reading audience of professional meteorologists, geophysicists, climatologists and advanced students in these subject-matter areas. In this reviewer's appraisal, it is definitely worth considering for one's professional bookshelf.

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References: Brown, H. C., Brown, C. A., *J. Am. Chem. Soc.*, **84**, 2827, 2829, (1962)

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LECTURES ON GAS CHROMATOGRAPHY—1964: AGRICULTURAL AND BIOLOGICAL APPLICATIONS, edited by L. R. Mattick and H. A. Szymanski (Plenum Press, New York, 256 pages, 1965, \$12.50).

This book is based primarily on lectures presented at the Sixth Annual Gas Chromatography Institute held at Canisius College, Buffalo, New York and the Pesticide Residue Analysis Workshop at Cornell University, Geneva, New York during 1964. In addition, several papers were solicited to make the text more complete.

Several sections of the book are devoted to the use of selective detection systems for gas chromatographic analysis of pesticide residues. These include papers by E. W. Cieplinski, Perkin-Elmer Corporation and E. J. Bonelli and K. P. Dimick of Wilkens Instrument and Research, Inc., on the use of electron capture detectors. J. A. Stamm of Dohrmann Instruments Co. and H. P. Burchfield and Associates of the Southwest Research Institute outline the theory and application for the microcoulometric detector in pesticide residue analysis. In addition, there are two specific papers on the analysis of pesticides in water by H. P. Burchfield, and the determination of pesticides in tomatoes and tomato products by J. A. Schmit and associates of the F & M Scientific Corp.

A number of papers are related directly to medical applications of gas chromatography including analysis of chlorpromazine and related compounds by D. E. Johnson and H. P. Burchfield, selective detection systems in analysis of drugs by H. P. Burchfield and associates, analysis of blood gases by C. Albers and L. E. Farkis and general medical applications by R. E. Johnson.

One paper is included on collection of fruit volatiles for gas chromatographic analysis by J. W. Roades and associates. S. W. Downer III of Consolidated Electrodynamics Corporation has a paper included on chromatographic peak analysis by mass spectrometry. Finishing up the volume are two papers by H. R. Felton of DuPont on preparative scale gas chromatography and troubleshooting in gas chromatography.

The book offers a good collection of material especially on instrumentation for pesticide residue analysis and information on applications of gas chromatography for medical uses. The paper on the use of mass spectrometry for identification of components of mixtures eluting from gas chromatographs offers a good source of information for researchers in this area. Further, Mr. Felton's papers on preparative scale gas chromatography and troubleshooting contain information useful to anyone using gas chromatography.

The content of the book varies from general information useful only to the novice in gas chromatography to some papers which more experienced persons will find useful. The lack of references

reduces the value of some papers. Further, references for all papers could have been presented in a uniform manner to improve the format of the book.

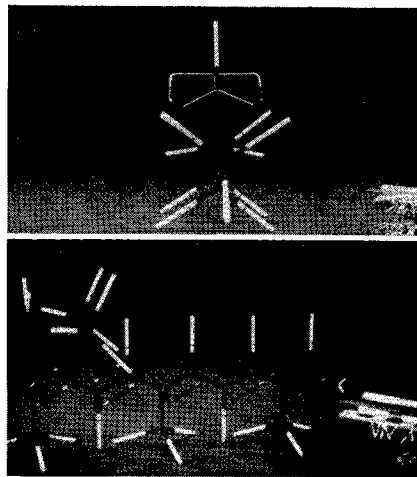
The book would be an excellent addition to the library of any chemist involved in the analysis of pesticides or the use of gas chromatography in other areas on either the analytical or preparative scale.

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FRAMEWORK MOLECULAR MODELS (Prentice-Hall, Inc., 1965, Price \$4.95 for 50-Atom Set; \$99.50 for 1000-Atom Set).

This is a welcome addition to the available sets for construction of models of chemical compounds. It consists of linear and angular fasteners to be connected by colored plastic tubing. A distinctive color of tubing is provided to represent each of the elements, C, H, O, N, S, P, Si, F, Cl, Br, and I. Besides linear and angular fasteners there are three types of valence clusters: 30 tetrahedron (silver), 18 trigonal bipyramid (brass) and 10 octahedron (copper). These valence clusters provide angles of 90°, 109°, 120° and 180° to represent all atoms having up to 12 electrons in their valence shells.

The Instruction Manual which accompanies this set gives complete directions for cutting the tubes and specifies the proper length of each to represent Van der Waal's radii as well as the atomic covalent radii; one inch of tubing represents one Angstrom. Thus, a C-H bond provides 0.77 in. (black) as the covalent radius of carbon, plus 0.30 in. and 1.20 in. (white) for covalent and Van der Waal's radii of hydrogen, for a total length of 2.27 in. The tubes are easily cut with scissors or knife and are properly sized to fit snugly over the valence cluster units and other metal fasteners. The assemblage of a given molecular structure fits together neatly and firmly.



Framework molecular models. *Above*, a structure of caproic acid; *below*, the highly unsaturated substance, specifically, one half of the β -carotene model.

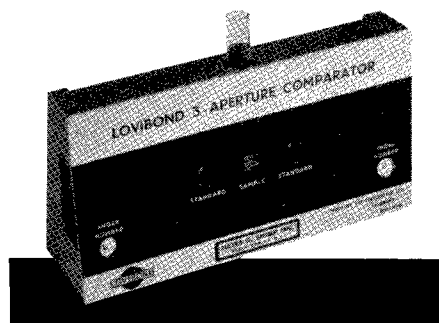
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Instructions are confined to assembly of the simplest types of models: several 1- or 2-carbon aliphatic compounds and one aromatic compound (benzene). From the examples given for ethylene and formaldehyde one can readily devise a suitable model for a fatty acid, a glyceride or a more elaborate structure such as a carotenoid.

Of particular interest to the lipid chemist is the type of structural unit which is recommended to represent a C=C linkage. The rigid structure which is prepared according to directions is much more satisfactory than the wobbly coil spring-type commonly used with ball and stick models. Fur-

thermore, the full orbital width, 3.08 Å (3.08 in. in the model) of the C=C linkage gives one the proper perspective of this unit in relation to the rest of the molecule. The instructions contain one error, in that they specify a 0.67 in. connector for two carbon atoms so linked. No other errors were observed in the Manual.

Teachers and research workers who are concerned with details of molecular structure will find this set a very useful addition to their experimental and illustrative materials.

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MARGARINE, 2nd Revised Edition, by A. J. C. Andersen and P. N. Williams (Pergamon Press, Oxford, 1965, 420 pp., \$17.50).

This second edition follows identically the format of the first edition. The chapters proceed from a brief introduction through a fairly detailed description of raw materials to quite detailed discussion of the various types of processing equipment. The final chapters, again quite brief, cover storage and preservation, process control, margarine legislation, and factory layouts. The book presents a good introduction to the practical aspects of margarine manufacturing.

The second edition has been expanded by the addition of some 93 pages more than the first edition. However, almost one-fifth of this increase is a result of using a smaller page size for the second edition. Unfortunately, while the second edition has been revised and expanded to some extent, it has not been updated to include the tremendous advances which have occurred in this field during the years since the first edition appeared in 1954.

Although some 60 new references were added, the text was revised very little to include discussion of the new information. In the sections describing the compositions of the fats and oils used in margarine, there is no mention whatever of the chromatographic methods that are now so universally used for analyzing these materials. In the sections on equipment and plants, most of the illustrations of the first edition were retained with the addition of only a few more recent diagrams and photographs. Again, the text was revised very little to include discussion of the newer processes.

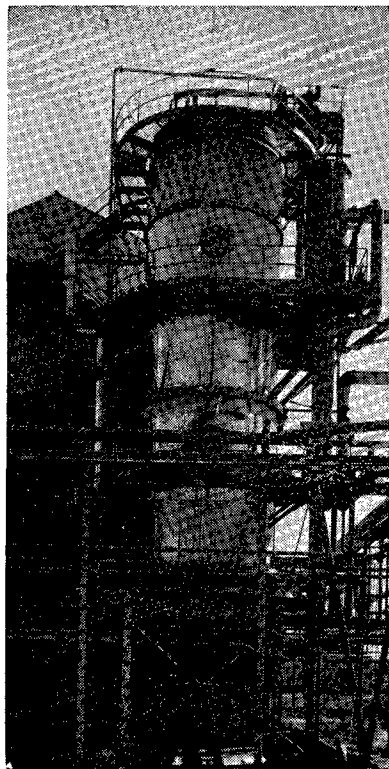
American readers will be disappointed to find so little discussion of cottonseed and soybean oils used so commonly in this country. They will, in fact, probably not recognize most of the blends of fats and oils that are presented as typical compositions of margarine. Corn oil received only a few sentences of comment in the book and safflower oil is merely mentioned. Barely two pages of cursory description covers whipped margarine, refrigerator margarine (long plastic range, spreadable products), and essential fatty acid margarines (high polyunsaturated content), whereas over five pages are devoted to vanaspati, an Indian margarine product.

Despite my personal disappointment that very little new information has been added to the book, it will still be of interest to all who are involved in any aspect of margarine production. There is still a need for more thorough exploration of the theoretical background of the subject; very little has yet been published in this area.

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