cussed that are normally not treated in paleobotany textbooks, such as the concept of a flower (= an inflorescence). However, Emberger has been most diligent; almost every topic usually mentioned in other paleobotany textbooks finds some representation here. His discussions are brief, written in French that is easily translated, but he avoids critical issues. For example, specimens of microfossils from the Lower Carboniferous of Russia, assigned to the genus *Tetraporina*, are illustrated with the noncommittal statement that the Russian authors consider the fossils to be angiospermous pollen grains but other palynologists consider them indeterminable or as algae. Greguss' examples of *Musciphyton* and *Hepaticaephyton* are illustrated and discussed as mosses, with mention that their "identifications are controversial." Emberger does not express a preference, and as a result questionable material acquires a measure of sanction.

Emberger's discussion of angiosperm polyphylesis is stimulating. He does not regard double fertilization and embryo sac necessarily as precluding derivation of angiosperms from several different gymnospermous groups. He points out difficulties in comparison of different primitive angiosperm types that have contrasting modes of placentation. Apparently the leaves of both *Sanmiguelia* (palm type) and *Furcula* (dicot type) are taken as evidence that monocot and dicot lines may be very ancient. Emberger does not consider the possibility that these modern-appearing types of foliage belonged to plants that reproduced like gymnosperms. His suggestions as to the different types of gymnosperms from which angiosperms may have been derived are no more convincing than previous suggestions. Nevertheless, these ideas probably deserve more consideration.

In a book of this size, some inconsistencies are inevitable. The text is not well coordinated with the extensive bibliography. The sources of quoted statements often are vaguely referenced, and it may be difficult to recognize innovations of interpretation. French vernacular terminations commonly are used in referring to families and taxa of higher rank. These contribute a certain amount of ambiguity, but are less objectionable than the attempt to change the spelling of *Ginkgo* (p. 490), Ginkgoales, *Ginkgoidium*, and so on to "Ginkyo-" because of questionable meaning and etymology. Such changes are contrary to both the preamble and article 73 of the Code of Nomenclature. Emberger also has used the term "phylum" in various applications. For this and other reasons, the book would not serve as a good basis for systematic study. Nevertheless, it is evident that much information is included in this volume, and, in conjunction with its adequate index (but names of authors are not indexed), the volume serves as a useful compendium.

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Data on Catalysis

Scientific Selection of Catalysts. A. A. BALADIN, B. A. KAZANSKII, V. E. VASSERBERG, G. V. ISAGULYANTS, and G. I. LEVI, Eds. Translated from the Russian edition (Moscow, 1966) by A. Aledjem. Israel Program for Scientific Translations, Jerusalem, 1968 (U.S. distributor, Davey, Hartford, Conn.). viii + 274 pp., illus. $11.50. Problems of Kinetics and Catalysis, No. 11.

One of the axioms of being an expert in catalysis is to avoid predicting the behavior of catalysts. The present book attacks this difficult problem. It presents most of the papers given at a conference that was organized by the late A. A. Balandin and was held in Moscow in July 1964.

The first chapter, by Balandin, presents probably his final thoughts on catalysis and the multiplet theory. This theory is mentioned in most chapters and is seriously considered in some. The book contains scores of correlations of data from catalytic reactions (bond energies, activation energies, reaction rates, the nature of the rate equation, and rates of exchange) with properties of the catalyst (magnetic moments, ionic radius, heats of formation, forbidden-zone width, contact potentials, holes in *d*-bands, Fermi levels), as well as cross-comparisons of different reactions. Many of these comparisons are interesting, but critical appraisal will require more than a casual reading. The "scientific" selection of catalysts still remains a process of collecting available data on catalytic reactions and properties of catalysts and making an educated guess. Nevertheless, it is a rewarding exercise to pause occasionally to evaluate the problems of catalyst selection.

Many of the principal Russian catalytic chemists are represented in this book. Most of the papers are summaries of substantial research, and are not the irksome short communications common in the Russian literature. Some papers are so highly condensed that the reader may find the text difficult; possibly the symposium audience had heard these arguments before. The chapters are crammed with practical catalytic data, reaction rates, and activation energies. The work of the surface physicist with his clean surfaces in ultrahigh-vacuum environments is not included.

The translation is good, except for an infrequent choice of a word or two that might cause the reader to pause momentarily. The book is nicely printed, but the type is too small for rapid reading. There are no indexes. A subject index would have been useful for finding work on particular reactions, correlations, and catalysts.

The translation merits a place in scientific libraries and in the personal libraries of those interested in the correlation of catalyst behavior with properties of catalytic materials.

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Vasoconstrictor

Serotonin. IRVINE H. PAGE. Year Book Medical Publishers, Chicago, 1968. 144 pp., illus. $7.95.

Two decades have elapsed since Irvine Page and his co-workers isolated and identified serotonin as the vasoconstrictive principle in serum, and during this period publications numbering in the thousands have attempted to elucidate the physiological function of this biogenic amine. Such an effusion of papers sometimes leaves even the most diligent reader with an impression that the serotonin literature is hopelessly chaotic, and the appearance of a succinct appraisal of this important field of research corrects a major deficiency in the literature. Few authors could equal Page's perspective in providing this timely overview of serotonin.

The monograph admittedly is not comprehensive and omits many tangential topics. Its chief value is in presenting a concise account of the trends and highlights in the major areas of serotonin research. In addition to an

adequate coverage of the biochemical and physiological aspects of serotonin, there are two chapters dealing with the possibility that the amine is a neurotransmitter in brain which may play a role in mental disease and in the action of psychoactive drugs. Another interesting chapter summarizes evidence for involvement of serotonin in a wide variety of disease states such as the carcinoid syndrome, phenylketonuria, anaphalactoid reactions, migraine, and more than a dozen others.

The author's tone is one of reminiscence, and his anecdotes impart a personal quality that makes the book delightful to read. He is impartial and generous in discussing the work of others, emphasizing those stimulating ideas which provide opportunities for future research. If the book suffers from anything, it is from the author's reluctance to be critical. The monograph will be of value to anyone seeking a short and readable review of the subject, and its selected bibliography (365 references) will undoubtedly be more helpful than an exhaustive one to beginners in the field. For more experienced readers, the book will prove a useful companion to the several comprehensive reviews on serotonin already in print.

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Liquid State

Simple Dense Fluids. H. L. FRISCH and Z. W. SALSBURG, Eds. Academic Press, New York, 1968. xviii + 430 pp., illus. $19.50.

It is a well-known and sad fact that in many areas of science experimental and theoretical work do not go hand in hand. These areas characteristically are "classical" subjects in which no major breakthrough has occurred in recent years. The underlying principles are "understood" or believed to be so, and all that is left is to compute and to experiment. Furthermore, since both the computations and the experiments are difficult, a lengthy and unglamorous malaise sets in and a good part of the work in these fields becomes pointless. Experimentalists grind out facts which may or may not be interesting and theoreticians grind out theories which may or may not be correct, and there is little of the stimulating interplay between theory and experiment which makes science a live subject and of more than academic interest.

Such a fate has to some extent befallen the study of dense fluids. This is a pity, for the subject is far from exhausted, understood, or uninteresting. Our environment and our bodies are full of that state of matter. But the theoretical study of dense fluids is difficult, very difficult. Unlike the gaseous and crystalline states, the dense fluid has no ideal state such as the perfect gas and the ideal crystal which can serve as a zero-order reference system.

There are, therefore, no obvious simple theories of dense fluids. This does not mean, however, that there cannot be correct theories. Such theories, once understood, will also turn out to be, I believe, expressible in reasonably simple terms. I believe, indeed, that much progress along these lines has been made in recent years. For this progress to come to fruition, it is essential that there be closer contact between theory and experiment. Only in this way can the truth be arrived at. To be specific, experimentalists have to do experiments that can distinguish between theories, which means, in essence, that they have to work with simple fluids, and theorists must be unsentimental in rejecting theories, however cherished, if they do not agree with experiment.

The book under review is an attempt to bring theory and experiment closer together. Its objectives, according to the editors, are: "to compile the best data available for simple systems," that is, noble gases, diatomic molecules, and methane; "to present the data in convenient graphical and tabular form"; and "to give each compilation some theoretical context to indicate the importance of these studies to the development of our current ideas about the liquid state."

The book consists of nine articles which vary in length from 7 to 108 pages. As might be expected, they also vary in the degree to which they achieve the objectives of the editors. I found the article by Hunter and Rowlinson on thermodynamic functions along the orthobaric liquid line (15 pp.) and that by Buff and Lovett on surface tension (11 pp.), as indeed all the articles, very useful; the article by Schmidt and Tompson on x-ray scattering studies (70 pp.) a bit too dry, with too much tabular material; and the article by Rice, Boon, and Davies on transport phenomena (108 pp.) too detailed for this kind of volume. I was disappointed not to find an article on computer studies of liquids, for such studies are the kind of "experimental" work most amenable to theoretical analysis. The bibliographies in all the articles are good, and the book should serve a very useful purpose in furthering the studies of liquids.

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Werner's Papers

Classics in Coordination Chemistry. Part 1, The Selected Papers of ALFRED WERNER. Translated from the German and edited by GEORGE B. KAUFFMAN. Dover, New York, 1968. xvi + 207 pp., illus. Paper, $2.50. Classics of Science, vol. 4.

This volume is a welcome addition to the literature of the history of inorganic chemistry. Kauffman has selected and has given complete translations of six of Alfred Werner's most significant papers on coordination complexes. From the 1893 essay in which Werner first presented his coordination theory through the 1914 paper in which he showed that optical activity is not a unique property of carbon compounds, the papers presented show Werner's success at verifying his explanation of the compounds that carry his name today—Werner complexes.

Because so much of Werner's work is valid today, the book is of interest to both chemists and historians of chemistry. In fact, a solid background in inorganic chemistry is useful for a full appreciation of the papers. Of particular value are the large number of footnotes that Kauffman has added to the papers and the brief introductory surveys that begin each chapter. Each paper is placed in its proper setting in the development of chemistry, and later work related to Werner's theory is frequently cited.

Only one minor error was noted: the reference on page 6 should be to Walther Kossel (1888–1956) rather than to his father, the biochemist Albrecht. This book clearly belongs in the library of anyone interested in coordination chemistry and its development.

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