one a glossary of geotectonic terms of Japan and the other a list of subgenera, genera, and higher taxa proposed in Japanese publications, help make this book a valuable source of information. The glossary is actually a series of thumbnail sketches that cover the major structural elements of Japan.

In the United States the language problem involved in getting at source material on the geology of Japan has kept our interest to a generally low level; few of us (and I am one of the many who have not) have made the effort to learn Japanese. The contributors to this volume are to be admired for their effort to bring to us, in our own language, material on the geology of Japan.

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Chemical Geology

Organic Geochemistry. Irving A. Breger, Ed. Pergamon, London; Macmillan, New York, 1963. x + 658 pp. Illus. $22.50.

Studies in Analytical Geochemistry. Royal Society of Canada, Special Publications, No. 6. Denis M. Shaw, Ed. University of Toronto Press and the Royal Society of Canada, Toronto, Canada, 1963. xii + 139 pp. Illus. $6.95.

Maturity and balance are the important characteristics that these two collections of geochemical papers have in common. *Organic Geochemistry* is a fat and comprehensive book that roundly summarizes just about every important phase of the field. The 18 authors of its 15 chapters, all leaders in the field, tell what is known of the organic geochemistry of everything from the cosmos to cadavers, with a generally high degree of detachment and completeness. *Studies in Analytical Geochemistry* is a thin sampler of a book making no pretense to comprehensiveness, but comprising an excellent selection of material (six subjects by seven authors) which shows the sweep, applications, and limitations of modern analytical geochemistry. These articles present conclusions drawn from the views and experience of their authors rather than complete summaries of the fields treated, but all are thoughtful and well balanced. A refreshing reserve runs throughout the book and contributes much to its coherence and force. The editor set the tone when he commented that "if careful fieldwork alone cannot reveal all the intricacy of nature, it is not to be expected that our contemporary geochemical techniques will do so either."

The papers in *Analytical Geochemistry* were originally presented at a symposium of the Royal Society of Canada in 1952 and all are reasonably current. The intent and the content of the book are well summarized on the jacket flaps and in the editor's preface, and all chapters include abstracts, but there is no index. *Organic Geochemistry* has an excellent index, but the papers were collected between 1957 and 1962, or later (the most recent reference is to a 1962 paper), the editorial preface does not provide a summary, and only 4 of the 16 articles include individual summaries. Each book, nevertheless, achieves a high degree of success—one as sampler, the other as comprehensive source book. The criticisms of content, which I might make to show that I have read these books, are essentially trivial and in no way detract from their significance as landmarks in chemical geology.

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Organic Chemistry

Methoden der Organischen Chemie (Houben-Weyl). vol. 6, pt. 2, *Sauerstoff-Verbindungen*, I, pt. 2. E. Müller, Ed. Thieme, Stuttgart, Germany, ed. 4, 1963 (order from Intercontinental Medical Book Corp., New York). xlviii + 952 pp. Illus. $55.

This is the first review published in *Science* of one of the major German works in the field of organic chemistry, of which 17 volumes have been published. The third edition of Houben-Weyl, a standard reference book for the techniques and instruments concerned with the chemistry of reactions, was used in organic laboratories all over the world. It had been published in 1925 (two volumes), in 1930 and 1941 (one volume each), had become obsolete, and was superseded by several American publications. On the initiative of O. Bayer, a chemist himself and one of the leaders of the German chemical industry, chemists in industry and in academic positions rallied from the German collapse to write a fourth edition of Houben-Weyl. Eugen Müller, an organic chemist with a strong interest in physics and instrumentation, is the editor; he is assisted by a board which consists of Bayer, H. Meerwein, and K. Ziegler. The first tome of the fourth edition was published in 1952.

The general plan of the treatise is shown by the titles of the volumes which have been published, some in more than one part: *General Laboratory Practice* (2 parts); *Analytical Methods; Physical Methods* (2 parts); *General (Chemical) Methods; Halogen Compounds* (2 parts); *Oxygen Compounds* (2 parts); *Sulfur, Selenium, Tellurium Compounds; Nitrogen Compounds* (2 parts); *Phosphorous Compounds*; and *Macromolecular Compounds* (2 parts). The new Houben-Weyl is a monumental accomplishment.

The present volume, *Oxygen Compounds*, part 2, is dedicated to Bruno Hauff. Until his death in 1963, Hauff, the moving spirit of the house that publishes the treatise, had devoted much of his effort to the project. The volume covers methods for the preparation and transformation of the following compounds: alcoholates, phenolates, enolates and chelates of metals (F. Schmidt, E. Bayer); organic derivatives of silicic acid (W. Simmler), boric acid (R. Köster), arsenous, arsenic, antimonous, and antimonic acids (W. Herrmann), and sulfurous and sulfuric acids (F. Sinn and K. Schimmelschmidt); esters of nitrous and nitric acids (A. Berthmann, H. Ratz), hypohalogenous acids (A. Hausweiler), and perchloric acid (K. Schwarzer); β-lactones (H. Kröper); and lactones (H. Kröper).

The names of the authors and their affiliations are indicative of expert treatment, and examination of the chapters shows dedication to detail. It is difficult to imagine that anyone entering the fields discussed would proceed without consulting this volume. The typography and technical preparation of the book are excellent.

A comprehensive treatise covering a large field will of course be based on a systematic plan. If the field is in a state of rapid development, however, and the publication proceeds over

many years, changes will take place which could not be foreseen. The editors deserve credit for their alertness towards new developments, and for their tolerance in accommodating them in the general plan of the treatise.

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Chemistry

Molten Salt Chemistry. Milton Blander, Ed. Interscience (Wiley), New York, 1964. x + 775 pp. Illus. $25.

During the past decade a resurgence of interest in molten salts was sparked by the increasing importance of high-temperature technology in general and by the needs of nuclear technology in particular. Although several short review articles and a couple of specialized monographs have been published, there is no general treatise comparable to this present volume.

Milton Blander, the editor, has successfully interwoven, within one volume, authoritative discussions of ten significant aspects of molten salt chemistry, presented by experts who themselves have made important contributions in the field. Throughout the book, emphasis is placed on the structure and thermodynamics of molten salt systems, as the following chapter titles indicate: "Equilibrium theory of pure fused salts," Frank H. Stillinger, Jr.; "Diffraction studies of the structure of molten salts," H. A. Levy and M. D. Danford; "Thermodynamic properties of molten salt solutions," Milton Blander; "Phase diagrams of fused salts," John E. Ricci; "Mixtures of metals with molten salts," M. A. Bredig; "Electronic absorption spectra of molten salts," G. Pedro Smith; "Vibrational spectra of molten salts," David W. James; and "Metal halide vapors: Structures and thermochemistry," S. H. Bauer and R. F. Porter. In addition, there is a fine chapter by Klemm on transport properties, including viscous flow, diffusion, and conductivity. The concluding chapter is a definitive exposition (by Liu, Johnson, and Laitinen) of electroanalytical chemistry in molten salts.

One might wish that there were a unified presentation of chemical reactions in molten salts and discussion of how they might be used for synthetic and other purposes. Of course, aspects of chemical reactivity are touched on in several chapters. Deviations from ideal behavior are discussed in some detail, and the question of whether nonideal behavior does or does not indicate the existence of complex ions is considered. This is not a source book of facts about molten salts but a broadly based exposition of fundamental concepts. In general, one will not find details about applications to various technological problems. However, there is much information about important specific chemical systems, especially in the chapters on phase diagrams, metals in melts, and electroanalytical chemistry.

Molten Salt Chemistry is certainly timely and a must in the library of every serious worker in the field of fused salts. This thought-provoking book, well documented with exhaustive reference lists, will suggest important future research and provide excellent collateral reading for advanced students of physical and inorganic chemistry. I warmly recommend it to libraries of chemistry and related technological areas.

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Inorganic Chemistry

Handbook of Preparative Inorganic Chemistry. vol. 1. Georg Brauer, Ed. Translated from the German edition (Stuttgart, ed. 2, 1960) by Scripta Technica. Reed F. Riley, Ed. Academic Press, New York, 1963. xxviii + 1002 pp. Illus. $36.

This translation of volume 1 of Brauer's *Handbuch* is a welcome addition to the reference literature of the English-speaking inorganic chemist. The translators have Americanized the work by removing the references to German suppliers, trade names, and glass and ground-glass joint sizes and substituting the American equivalents. They have improved the nomenclature and revised or omitted certain brief sections. All references to "liquid air" have been changed to "liquid nitrogen." A precautionary note (p. 44) has been added regarding the hazards of using liquefied air or oxygen as laboratory coolants, but the fact that the condensation of atmospheric oxygen in any open container of liquid nitrogen effectively converts it into liquid air is not mentioned.

This work contains contributions by a group of experienced German chemists who have exercised great care in selecting only those synthetic procedures that have been tested and confirmed in the laboratory. Part 1, Preparative Methods, by P. W. Schenk and G. Brauer, provides an excellent description of special methods and devices for preparative inorganic chemistry. This part will be particularly valuable to the novice in inorganic laboratory work because it contains descriptions of many of the more subtle aspects of laboratory technique, aspects that often make the difference between a good result and a mediocre one.

Part 2, Elements and Compounds, is divided into 18 sections, each devoted to compounds for a particular element or group of related elements. The coverage includes most of the elements in the periodic table, exclusive of the transition series and the rare gases. Compounds of the transition elements along with special classes of substances are considered in volume 2, which is now being translated.

The translation is well done, and it is without significant errors. However, misprints are inevitable in a volume of this size. For example, on page 218, the boiling point and density of PbF_2 are listed as 129°C and 824, respectively, but they should be 1293°C and 8.24.

The book is clearly printed and will be easy to read. It is valuable because it brings together the methods for preparing several hundred inorganic compounds.

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Nuclear Structure

Nuclear Theory. Pairing force correlations and collective motion. A. M. Lane. Benjamin, New York, 1964. xii + 250 pp. Illus. Paper, $4.95; cloth, $8.

Some 6 years ago Bohr, Mottelson, and Pines suggested a possible analogy between the energy gap displayed by superconducting metals and the ex-