

Schwarzbach (sponges, corals, brachiopods); H. Sieverts-Doreck (echinoderms); H. Schmidt (palaeoammonoids); F. von Huene (fossil vertebrates).

As is almost inevitable in such an undertaking, the reviews differ greatly in degree of detail. In part this is a valid reflection of the times; the section on salt domes (nine pages plus a map), while disproportionately long at first glance, is an obvious result of the wartime search for oil. Stress on practical applications of soil science and upon soil-mapping techniques is in part a result of the war; in addition, there is great interest in detailed investigations of soil genesis.

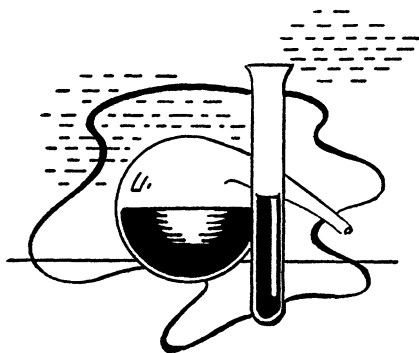
Work in petrofabrics and tectonics has occupied its usual conspicuous position in German geology, as evinced by extended treatment of the subject in general and its application to various regions. Paleontology has not fared so well.

Each section of the volume is accompanied by a bibliography. These are extensive and will be most useful.

The contributors and subjects are listed here because the present edition is a limited one, for government distribution (inquiry should be made to Office of Military Government for Germany [U.S.], Economics Division, Research Control Branch, U. S. Army, APO 742, Berlin). The manuscript for the volume has been turned over to a committee of German scientists for reprinting and perhaps wider distribution. It is hoped that this will be possible. The Office of Military Government is to be congratulated for sponsoring such a valuable synthesis.

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**Aquametry: application of the Karl Fischer reagent to quantitative analyses involving water.** John Mitchell, Jr., and Donald Milton Smith. New York: Interscience, 1948. Pp. xi + 444. (Illustrated.) \$8.00.

This book, Volume 5 of a series of monographs on analytical chemistry and its applications, brings together for the first time everything that has been published on the theory and use of the Karl Fischer reagent. Written by the two outstanding investigators in this field of chemical analysis, it will serve those who are already experienced in the use of the Karl Fischer reagent as well as those who are beginning to use it for the first time. It is well organized and clearly written.

The book was not intended to be a comprehensive treatise on all the methods for the determination of water. But the authors have given a brief and thorough review in the first chapter of the various techniques already published.

Part I deals with the specific quantitative determination of water by Karl Fischer reagent, and an early chapter presents an orderly summary of the directions for preparing and standardizing the reagents. All of the procedures which make use of the reagent are given here and this part of the book will serve as a convenient laboratory manual.

The nature of the chemical reactions involved are thoroughly discussed, with much quantitative data never before published. A chapter is devoted to the various titrimetric procedures, both macro and micro, that have been found useful. The determination of water in various organic compounds, in commercial organic materials, and in inorganic compounds is then considered. The final chapter of Part I is concerned with the spurious reactions of Karl Fischer reagent with inorganic compounds which must be guarded against.

Part II presents various applications of Karl Fischer reagent to those types of organic reactions where water is liberated or consumed. Methods are given for the quantitative determination of the following organic functional groups: alcoholic hydroxyl, carboxylic acids, acid anhydrides, carbonyl compounds, amines and nitriles, peroxides, and a few miscellaneous organic compounds.

The final chapter discusses some proposed further studies involving Karl Fischer reagent, such as possible modified reagents, applications to organic reactions which interfere with the present reagent, and quantitative determination of inorganic compounds.

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**Principles of high-polymer theory and practice.** Alois X. Schmidt and Charles A. Marlies. New York-London: McGraw-Hill, 1948. Pp. xii + 743. (Illustrated.) \$7.50.

Most books on this subject are too specialized to give the uninitiate a broad, clear picture of the nature and behavior of high polymers. Again, most authors are so preoccupied with describing the characteristics of specific materials that they too frequently overlook the fundamental principles underlying all high polymers. As a result such books are of interest primarily to those engaged in special fields of high-polymer chemistry, physics, or engineering, and are not particularly suitable for use as textbooks.

The authors' aims in writing this textbook on the principles of high-polymer theory and practice have been to avoid shortcomings such as these, "to present a broad, coordinated treatment of a field in which about one-third of all American chemists and chemical engineers are currently employed," and to demonstrate "how fundamentals of physics, chemistry, and engineering may be applied universally to the materials in question." As

a result, stress has been placed not only on purely chemical aspects of the subject, but also on physico-chemical, rheological, and structural principles underlying high polymers, their properties, and their applications.

The contents of the book may be judged from the chapter headings: 1. Introductory Definitions and Concepts; 2. Molecular Forces; 3. Some Special Behaviors and Properties of High Polymers; 4. Polymer Formation and Modification; 5. Structures of High Polymers; (6) Solubility and Molecular Weight Relations; 7. Rheology; 8. Molding and Manipulation; 9. Mechanical Properties; 10. Electrical, Thermal, and Optical Properties; 11. Fibers and Fibrous Products; 12 and 13. Rubbers; 14. Surface coatings; 15. Adhesive; 16. Resin Product Development. The book also includes an appendix section on high-polymer literature; properties of various fibers, plastics, and rubbers; adhesion, compatibility, and solubility of sundry materials of interest; and a table of chemical formulas and trade names of high polymers. The combined author and subject index covers 28 pages.

In their presentation the authors have treated briefly some topics which could stand fuller development, or have oversimplified the presentation in some instances for the sake of generalization. However, in a book of this type such a procedure is unavoidable. In the reviewer's opinion the authors have well attained their stated aims, and they have performed a real service in reducing to fundamentals the multitudinous aspects of high-polymer theory and practice. The book should prove well suited as a text for a good course in high-polymer principles, as well as a stimulating and valuable reference on the shelf of persons interested in high polymers.

The present volume has been published as part of the McGraw-Hill *Chemical Engineering Series*. The reviewer considers this classification misleading. Although it was written by teachers of chemical engineering, the book throughout reflects a broad and fundamental, rather than an engineering, approach to the subject, and it should have, therefore, a much wider field of interest than its classification would suggest.

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**Diagnostic techniques for soils and crops: their value and use in estimating the fertility status of soils and nutritional requirements of crops.** Herminie Broedel Kitchen. (Ed.) Washington 6, D. C.: American Potash Institute, 1948. Pp. xxiii + 308. (Illustrated.) \$2.00.

This volume, sponsored by the American Potash Institute, consists of a historical introduction by Firman E. Bear and contributions by eleven other agricultural scientists, all assembled under the editorial guidance of Herminie Broedel Kitchen. It brings together the most recent methods for the testing of soils and plants for their content of several nutrient elements. Even though most of the material has previously been published in various

journals, its assembly into a single volume represents a helpful service. It is testimony of increased attention to the possible chemical interactions by which soil nourishes plants.

The chemical methods for assessing soil fertility are clearly presented. These details will be very helpful to the student of soil chemistry and plant nutrition. The discussion of the correlation of soil tests with crop responses to fertilizer treatments, by R. H. Bray, is not only interesting but very enlightening. It accentuates the need for more information of this type, especially when commercial nitrogen and trace elements are moving into more general use. Such information is leading the agronomist, and anyone concerned with crop production, to look more to the soil in place, and not only to the crop and the soil in general.

The details of mass testing myriads of soil samples in a state or industrial laboratory appear less valuable. One is reminded that assembling data of multiplied cases on state dimensions has less virtue than educating individual farmers and county agricultural advisors by means of a few tests on specific soils whose history is a personal or lifetime experience.

The entire volume is well justified by the contribution discussing the testing of plant tissues in relation to their visual symptoms of malnutrition. This is excellent reference material. There is in this the starting point for diagnostic reasoning going from the visual symptoms of the growing plants to their deficiencies in nutrient chemical elements as parts in the plants' synthetic performances, and from there to their supply in readily exchangeable form in the soil.

The discussion of the biological assays of soil fertility omits those which have been superseded by rapid chemical methods. It develops new assays fitting the instances where chemistry is difficult or inadequate. Through the biological assays the symptoms of the plants are tabulated in greater detail in relation to the levels of nutrition as fertility of the soil. It is these symptoms that prompt their diagnosis as related to irregularities in the soil growing the crop.

The service this volume performs is its encouragement and help toward more careful observation of the plants as they reflect the nutritional services of the soil growing them. It will help to increase critical observations by the farmers themselves. The fact that enough differences in growth behavior of plants have been observed to challenge our diagnosis of the plants' physiological irregularities provoking them draws attention to the recent progress in both plant and soil sciences by which plant functions are causally connected with the chemical dynamics only recently elucidated for the soil. It is a gratifying record of these two sciences that soils and crops are becoming more closely linked in our understanding of plant growth as the creation of the living organic from the lifeless inorganic; it is also gratifying that a volume like this should help us view growth performances by the plant as those in which irregularities submit to diagnosis via procedures no different in principle from