crete plants, an alga and a fungus. This union forms the characteristic lichen unit, described as the thallus, which exhibits as much variability as other plants. Therefore, it is important to have authoritative texts on the anatomy of lichen thalli and on all other structures of the thallus, which will serve to advance knowledge of lichens in general and of lichen terminology pertinent to anatomy. The field of lichenology is far from static; it is attracting the attention of physiologists, biochemists, and others who find in this unique association problems of great interest. These investigators, as well as students of lichenology, will find that Ozenda's volume is the most recent source to present knowlege on lichen anatomy.

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Chemical Analysis

Organic Functional Group Analysis. F. E. Critchfield. Pergamon, London; Macmillan, New York, 1963. viii + 187 pp. Illus. $6.50.

This compact volume was designed "to provide a collection of versatile and reliable chemical methods for determining most of the more common organic functional groups." It accomplishes this objective in a very precise and practical manner. The selected material, while largely determined by the needs of the laboratory with which the author is associated, is sufficiently broad in scope to cover the majority of functional groups encountered routinely in most laboratories. The organization and style provide a considerable amount of information in a most concise and clear manner. The scope and limitations of each method are discussed, and the clarity with which the procedures are presented is in accord with the author's statement that they can be performed by competent nontechnical personnel. A praiseworthy feature is the inclusion of directions for preparing the reagents for which directions are needed. Almost all of the references (which are placed at the end of each chapter) are to the original literature and thus give direct access to actual experimental results rather than to the generalities often encountered in secondary references. The index is reasonably complete.

The treatment of acids and bases is exceptionally well done and includes consideration of both aqueous and nonaqueous media. The latter deals mainly, but not exclusively, with acids in pyridine solvent, but considers bases in acetic acid, nitromethane, acetonitrile, and acetic anhydride. The problem of changes in relative acidities, including inversions in order, is discussed. Also included are the determinations of epoxides, esters, anhydrides, and imines by indirect methods, differentiation titrations in water and in several nonaqueous solvents for both acids and bases, and a very readable coverage of indicators, also for both aqueous and nonaqueous solvents.

In summary, this book can be recommended to the chemist who has a considerable number of analyses to perform, with or without the aid of a technician, and also to the chemist who needs to use such methods less often but at that time wants a concise but reasonably complete write-up of well-tested procedures conveniently at hand.

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Mathematics

The Teaching of Mathematics. From intermediate algebra through first year calculus. Roy Dubisch and Vernon E. Howes. Wiley, New York, 1963. xii + 124 pp. Illus. Paper, $2.95.

The first draft of this handbook was written during 1951 and 1952 while Dubisch was a Faculty Fellow of the Fund for the Advancement of Education. According to the preface, he intended ". . . to provide the new teacher of mathematics with some general guidelines on the teaching of mathematics and some specific suggestions in regard to classroom procedures. . . . [and furthermore] . . . to provide both the inexperienced and the experienced teacher with an annotated bibliography of articles on the teaching of mathematics from the intermediate algebra level through first-year calculus."

In three preliminary chapters the authors deal with teaching in general, the aims of mathematics teaching, and problems in the teaching of mathematics; they then consider specific suggestions for teaching algebra, trigonometry and logarithms, analytic geometry, and differential and integral calculus. In these latter chapters, an extremely judicious selection of topics is examined in a lucid manner. The pedagogical as well as the mathematical problems associated with each topic are reviewed, and references to sources contained in the extensive bibliography are skillfully woven into the discussion. The bibliography consists of 402 items published during the period 1884 to 1963, of which about 10 percent are post-1958 works.

Throughout the handbook many practical suggestions are provided. The following quotations are typical examples: "A rough estimate [of the time required for homework] can usually be obtained by the instructor if he works the problems himself and multiplies the time it takes him by four"; ". . . rules and methods of algebra should always be first explained from the numerical viewpoint"; and "The instructor should use care, however, that he not make the work too lengthy and boring to the average student by excessive harping on the theory."

Every graduate assistant or instructor at the undergraduate level should have access to this volume. The more experienced teacher will find it extremely valuable, and although it appears to be directed more toward the college instructor, the teacher of advanced secondary school mathematics courses will also find it useful.

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Inorganic Solution Chemistry

Metal Ions in Aqueous Solution. John P. Hunt. Benjamin, New York, 1963. xii + 124 pp. Illus. $5.50.

The resurgence of inorganic chemistry following World War II was due, in large measure, to the careful work done on the nature of species in aqueous solution. In the past few years, such studies have been eclipsed somewhat by the vast amount of preparative work stimulated by the successes of ligand field theory. There has been a definite need for a book to introduce the student to inorganic solution chemistry, particularly for a work that emphasizes the newer theoretical studies and experimental methods. With certain res-