ing need of ordered analysis and evaluation.

Although its title might suggest that the book is of interest primarily to tree physiologists, wood specialists, and forest botanists, it deserves a wider audience because of its broad approach and the depth of its treatment of the specific subjects covered. General botanists, plant anatomists, plant physiologists, and plant biochemists should find many of the papers more readable and more interesting than papers on similar subjects in technical journals.

The book is well printed, bound, and illustrated and has author and subject indices. Many significant literature references, including those to papers mentioned in the discussions, are provided. It seems unfortunate that the references to papers generally lack titles and sometimes lack inclusive page numbers. Such omissions are an annoyance to scholars who do not have direct access to the few great biological libraries. Complete bibliographic information is a great aid in deciding which works are worth borrowing on interlibrary loan.

The editor and publisher deserve praise for getting this well-produced book, quite free of errors, into print while the factual information and discussions that it contains are still relatively fresh.

JOHN A. ROMBERGER
Forest Physiology Laboratory, U.S. Department of Agriculture, Beltsville, Maryland

Chemical Technology

Methods of Quantitative Inorganic Analysis. An encyclopedia of gravimetric, titrimetric, and colorimetric methods. Kazunobu Kodama. Interscience (Wiley), New York, 1963. xiv + 507 pp. Illus. $22.

This book contains a comprehensive summary, complete through 1957, of published methods in the fields of inorganic gravimetric, titrimetric, and colorimetric analyses. The book is divided into three parts. Part 1, General Considerations (41 pages), contains brief information of a general nature on sampling, the solution of samples, separations, and determinations; part 2 (56 pages) is devoted to organic reagents used in inorganic analysis, classified by their reactions. Part 3 consists of more than 300 pages in which are outlined the determination of the elements, listed according to the classical order used in Hillebrand and Lundell's book. Each element is considered according to methods of attack, separation, and determination. The selection of methods appears to be good, and extensive use is made of tables and flowcharts. Sufficient information is given, in most cases, to permit selection of the method most suitable for a given problem.

The method of presentation and the good general index add to the usefulness of the book and the extensive index of organic reagents is especially valuable. Some 4000 references make this volume a virtual key to the literature of classical chemical analysis.

JOHN K. TAYLOR
Analytical Chemistry Division, National Bureau of Standards

Mathematics

Fundamentals of Scientific Mathematics. George E. Owen. Harper, New York, 1964 (© 1961, Johns Hopkins Press, Baltimore, Md.). xii + 274 pp. Illus. Paper. $1.75.

Although this book is very attractive and most ambitious in its purpose, it fails, on the whole, by trying to do too much. Its five chapters cover the topics of geometry and matrices, vector algebra, analytic geometry, functions, and differential and integral calculus. The audience is claimed to be high school seniors and college undergraduates, together with high school teachers of mathematics and science; few of them will have the background or the patience to follow the condensed treatment of such a book as this. It may serve as a review or as a new viewpoint on old ideas for one who knows most of the material, but it will teach little. For example, there are no exercises in the book, and who ever heard of learning mathematics without doing some? There should be a special bow, however, to the attractiveness of the illustrations and their general excellence. Only occasionally are they confusing or inappropriate (examples to illustrate the comment will be found on pp. 6, 7, 8, 11, 26, and 29). The first chapter is one of the poorest; the quality improves in the others, with the chapter on analytic geometry one of the best.

Mathematics is treated completely as a tool, with little evidence of an understanding of the logic of mathematics, its motivation, or its structure. This is a common failing with engineers, but not so common with physicists, and it leads to a cookbook approach to procedures which stress rules without reasons (p. 21). Although there is a great deal to be gained by using physical and geometric introductions to aid intuition, the clarity of the mathematics often suffers. Another influence of this mechanical approach to mathematics is found in such careless statements as the following: "Q is very close to P" (p. 20), and in an apparent confusion between the uses of approximate differentiation and integration and the exact uses of these processes. It is unusual to try to explain the approximate methods before explaining the exact ones which they approximate.

There are mathematical deficiencies and mistakes. The fuzziness of the language sometimes gives the impression that the book has been translated from a foreign language. Examples of awkwardness are found in the introduction of right and left handed coordinate systems (pp. 12, 13); the general discussion of coordinates (p. 16); cylindrical and spherical coordinates (p. 17); scalar multiplication (p. 65); intervals (p. 167); and derivatives (p. 207). Simple mathematical ideas are muddled—for example, the associative law, the distributive law, and the law of cosines (p. 68). Inexact expressions creep in: the "length element" (p. 18); and two vectors "form a plane" (p. 75). The idea of limit is poorly introduced (pp. 203, 207), and the concept of *function* is hopelessly out of date (p. 167). Basic words such as *definition* and *proof*, fundamental in mathematics, are not properly used (pp. 68, 219). Finally, a symptom of the lack of contact of the author with mathematics is his misspelling of such common words as chord (spelled cord) and paraboloid (spelled paraboid).

It is not clear what background is assumed for this book, or whether that background is appropriate for this type of book. There are places where trigonometry is assumed (pp. 19, 220), but also the summation notation (p. 28), determinants (pp. 33, 45), and the power series expansions for trigonometric functions (pp. 20, 211).

Some terms are used before they are explained in the book, or they are not explained at all. Will Coriolis ac-