elementary exposition of the theories of solution, ionization, etc., would not have been out of place. EDWARD H. KEISER.

A TEXT-BOOK OF QUANTITATIVE CHEMICAL ANALYSIS. BY FRANK JULIAN. St. Paul, Minn.: The Ramsey Publishing Co. 1902. 604 pp. Price, $6.00 net.

"This volume is intended for the aid of students who, having a fair acquaintance with the elements of general chemistry, can devote a limited time to quantitative analysis concurrent with or following the usual qualitative course; and as an introduction to the monographs on special departments of technical analysis....."

"In Part I, after outlining the general principles of the art, there are described the operations of solution, precipitation, etc., and the appliances commonly employed for the purposes." In Part II is found "a graded series of exercises chosen with a view to illustrate the leading principles in analysis....." In Part III technical analysis and special methods are considered. Part IV contains "Notes on the Methods of Analysis," while an appendix offers a discussion of "certain phases of the important subject of the practice of technical and industrial analysis."

This brief summary may serve, perhaps, to give an idea of the scope of the book. It seems hardly probable that it will be serviceable to students, who "can devote only a limited time to quantitative analysis," nor to "those who are content to remain permanently at routine analysis," but to young men who wish to become chemists, to more advanced students, who are anxious to broaden their horizon, and to the technical chemists, who have regard for something beyond their daily duties, it can not fail to be helpful.

Although it lacks, necessarily, the detail of special monographs or of extended works like those of Boeckman, Allen, and others, there is scarcely a similar book of moderate size, in which so many valuable suggestions can be found.

Among the topics treated with exceptional fulness are the following: Attributive Methods, Calculation of Analyses, Errors and Precautions, Colorimetry, Proximate Organic Analysis, Notes on the Methods of Analysis.

One may question the usefulness of this book as a laboratory guide, another may prefer a different selection of exercises for the illustration of the principles of analysis; others may hold opinions

contrary to those of the author, but none, I think, will fail to find it abounding in information, stimulating and tending to the advancement of the science and art of analysis. L. B. HALL.

QUANTITATIVE CLASSIFICATION OF IGNEOUS ROCKS, BASED ON CHEMICAL AND MINERAL CHARACTERS. BY WHITMAN CROSS, JOSEPH P. IDDINGS, LOUIS V. PIRSSON, HENRY S. WASHINGTON. With an Introductory Review of the Development of Systematic Petrography in the Nineteenth Century, by WHITMAN CROSS. Chicago: The University of Chicago Press. London: William Wesley & Son. 1903. 283 pp.

In this volume have been brought together the two essays under the above titles that appeared in Volume X of the *Journal of Geology* (see abstracts in this Journal, **24**, R., 454, and **25**, R., 7), with the addition of tables to aid in the calculation of the mineral and chemical compositions of rocks, and with a glossary of the new terms employed in the nomenclature. To adequately review this important work would require much space. It seems, therefore, only necessary to refer to the second of the above-mentioned abstracts, and to quote the following passages from the authors' preface.

"Much of the material will be useful to those, also, who do not follow the new classification, since it has a general application to petrography. Thus the 'Review of the Development of Systematic Petrography in the Nineteenth Century' presents a historical sketch of the subject which is valuable to all students of petrology."

"The methods of calculation by which the minerals of a rock may be reckoned from its chemical analysis, and the reverse process, will become more and more of a requirement in the practice of petrographers, as the demand for quantitative description increases. And the convenience of tables in carrying on the operation will be appreciated by all who undertake the work."

"The glossary will be found useful to those who adopt the new system in defining specifically each new term, particularly the magmatic names which appear for the most part only in the tables of the five classes where it requires some consideration to frame their definitions. Their full value will be appreciated when they are studied in connection with the collection of some thousands of rock analyses made within the past fifteen years, which has been prepared by Henry S. Washington, and will be published shortly."

"It is hoped that the present publication will contribute to the