but to glance over the pages of this little volume to see what a wealth of suggestion for new work there still is in the old idea of valence. What if we do find that our old notions in regard to the limited and fixed valence of oxygen, and perhaps that of carbon, have to be altered to some extent? By such an extension of our ideas we are enabled now to better correlate many phenomena which previously found no adequate explanation. The subject treated by Dr. Schmidt, to use his own words, "is of equal importance for the organic, inorganic, and physical chemistry. Nor is it devoid of practical interest, for the idea of the tetravalence of oxygen gives us, already, a new insight into the constitution of such important dyestuffs as the oxazines, the thiazines, the pyronines, rosamines, rhodamines, etc."

The book is divided into two parts: About 90 pages are devoted to oxygen, and 15 to carbon. The first part includes, among others, the work of Collie and Tickle on the salts of dimethylpyrone; the investigations of Baeyer and Villiger on the salt-forming properties of oxygen compounds in general; the azoxonium and azothionium salts of Kehrmann; the carboxonium and carbothionium salts of Werner, and, finally, a very readable summary of the several physical-chemical investigations that bear upon this subject. The second part is, of necessity, much smaller; it presents a brief summary of the literature relating to triphenylmethyl, to the salt-like nature of its compounds, the effect of methoxyl groups upon that, etc.

The presentation of the subject is entirely non-critical; the references to the original literature are very full.

M. GOMBERG.

QUANTITATIVE CHEMICAL ANALYSIS. By the late DR. C. REMIGIUS FRESENIUS. Authorized translation of the greatly amplified and revised sixth German edition, by ALFRED I. COHN. New York: John Wiley & Sons. 1904. Two volumes. xii + 780 and xxii + 1255 pp. Price, $12.50.

The preface to the first American edition of this work bears the signature of Samuel W. Johnson and is dated December, 1869, that edition being a translation of the greater part of the fifth German edition. The second American edition bears a preface signed by O. D. Allen, dated February, 1881, and it is there stated that the first volume of the sixth German edition of

the work was in the editor's possession at the time this revision was made. In both of these editions the editors (or translators) have abridged the work somewhat by the omission of certain entire subjects and the curtailment of others, which, in their judgment, treated of methods that were "more curious than useful." Some new material was also inserted by them.

The present issue is a faithful translation of the entire material comprising the two volumes of the sixth German edition, with which has been incorporated the matter inserted by Messrs. Johnson and Allen in the previous American editions, and to which have been added some fifteen or more procedures in the "special part" which have the approval of the translator. Finally, the official methods of analysis, adopted by the Association of Official Agricultural Chemists (Bulletin No. 46 of the U. S. Department of Agriculture) and Dr. Hillebrand's excellent monograph on "Some Principles and Methods of Rock Analysis" (Bulletin No. 176 of the U. S. Geological Survey) are added as Appendix I and II. The table of factors and their multiples, and other values throughout the book, have been recalculated on the basis of the atomic weights of 1902, and both volumes are admirably indexed.

It is rare indeed in recent times that any work has been able to hold an authoritative place in scientific literature through three generations of chemists, all of whom have held it in the highest respect. It is, therefore, only fitting that the very considerable labor which it has cost to prepare an edition in English of this classical work of Fresenius should be duly recognized and appreciated. At the same time, it may be fairly questioned whether the introductory sentence of the translator's preface, to the effect that "the great advances in analytical chemistry since the publication of the previous edition of this work and the introduction of numerous new methods of analysis, and improvements upon older ones, have necessitated a new translation of the most recent German edition" does not lead one to expect a modern, up-to-date treatise, whereas, the first volume of the sixth German edition, of which this is essentially a reproduction in English, bears the imprint of 1875, that of the second volume being 1877-1887. The additional procedures inserted by the translator, while doubtless of value in themselves, do little toward modernizing the

book as a whole, and all who expect to find an up-to-date treatise are bound to be disappointed. Much of the first volume is the unaltered translation of Johnson and Allen; indeed, many of the plates used in this volume are those used in an edition purchased in 1883, while many of the cuts are very badly reproduced, being inferior to those in earlier American editions. It would seem strange, if not inexcusable, to find in a work bearing the date 1904 on its title-page a cut of an old charcoal furnace referred to as "a common combustion furnace" (p. 75, Vol. I), and equally surprising to find no reference to such a determination as that of zinc in the form of phosphate, were it not that this edition must be regarded as a reproduction of an honored (but decidedly old) treatise. As such it is to be commended, and it is very much to be regretted that the publishers have found it necessary to place an almost prohibitive price upon this edition, since it would otherwise doubtless find its way into the library of many of the younger generation of chemists for whom it still has much value as a reference work.

Doubtless the index to the earlier American editions has served to chasten the moral character of many a chemist; nevertheless it is a relief to contemplate the results of the translator's labors in this department. He has earned the gratitude of all users of the volumes. H. P. TALBOT.

A THEORETICAL AND PRACTICAL TREATISE ON THE MANUFACTURE OF SULPHURIC ACID AND ALKALI WITH THE COLLATERAL BRANCHES. By GEORGE LUNGE, PH.D., Professor of Technical Chemistry at the Federal Polytechnic School, Zurich; formerly manager of the Tyne Alkali Works, South Shields. Third edition, revised and enlarged. Vol I in 2 parts—Sulphuric Acid. London: Gurney & Jackson. 1903. 8vo. xxvii + 1214 pp. Price, 2£ 12s. 6d.

The second edition of the first volume of this work appeared in 1891 as a volume of 911 pages. An appendix to Vol. III brought the work down to 1896. Since then the development of the contact process, as well as of the old leaden chamber process itself, has made a new edition necessary, and this the author has prepared with characteristic industry. The volume before us is practically a new book, since much of the material is entirely new and all of it has been carefully rewritten. It is to be hoped that this is not to be, as intimated in his preface, the