it may show whether or not the water is polluted, does not give information regarding the amount or condition of the polluting matter; that with ground and artesian waters it often gives very little information, and that an opinion regarding the character of such waters must, as a rule, depend on the sanitary analysis.

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SCIENTIFIC BOOKS.

Handbook of Metallurgy. (In two volumes.) By Dr. Carl Schnabel, Professor of Metallurgy at Berlin. Second edition. Volume I., Copper, Lead, Silver, Gold. Translated by Henry Louis, Professor of Mining at Armstrong College, Newcastle-on-Tyne, England. 8vo, cloth covers, 715 illustrations. Pp. 1,123. Contains a geographical and a general index. New York and London, The Macmillan Company. Price, $6.50.

This volume, which is the English translation by Professor Louis of Dr. Schnabel's classic work, needs but the mention to declare its excellent merit, so widely known are both author and translator. The first German edition of Dr. Schnabel's admirable work of two volumes appeared in 1898, and was shortly afterward translated into English by Professor Louis. Both works were so well received that Dr. Schnabel issued a second edition, Vol. I. in 1902 and Vol. II. in 1904. The present book under review is Professor Louis' English translation of Vol. I. The English translation of Vol. II., which will also be made by Professor Louis, is expected to be published in 1906.

The translation of Dr. Schnabel's great work furnished the first complete treatise on metallurgy (except for iron) that has appeared in the English language, although many small text-books, covering the entire field but making no claim to thoroughness of detail, have been published; as have also several excellent monographs dedicated to the metallurgy of individual metals.

Dr. Schnabel's object has been to give a complete description of the metallurgical treatment of all the metals (except iron), pointing out the underlying chemical principles, and for each case, giving examples drawn from actual practise. His broad knowledge of the subject has rendered him eminently fitted for this herculean task, and he has supplemented his personal knowledge by full reference to and abstract from the works of that well-known trio of American metallurgical writers—Egleston, Peters and Hofman. So excellent was his work that the first edition received well-merited praise throughout the metallurgical world. A few adverse criticisms were made, but these were directed mainly to the mechanical features of the books—for instance, a collective index for both volumes was given at the end of volume II. and no index whatever in volume I. This objectionable feature of the first edition has been removed in the second edition, each volume of the latter having its individual indexes—an improvement of great value in referring to the books.

Another criticism of Dr. Schnabel's work was that too much space had been given to the history of active processes and the description of obsolete ones; but knowledge can not be too thorough for the earnest student or inventor who needs a reference work that will cover the entire subject. A knowledge of both past and present practise is needed in order to know not only 'what to do' but also 'what not to do.' The chemical principles which underlie a metallurgical process remain fixed and constant, but the application of new forces, the development of mechanical appliances for handling raw materials and part or wholly finished products (indeed, in many cases, for the physical action of the furnace itself) are important factors bearing on the proper conduct of metallurgical treatment of ore or metal. Frequently, metallurgical processes are of such rapid development that theory to-day becomes practise to-morrow; and, as a corollary to this fact, good practise to-day becomes merely historical record to-morrow. For this reason a comprehensive treatise on the subject should contain not only a description of present practise, but also a record of the developments which have led to it. In

this respect, Dr. Schnabel has attained success.

The second edition has been largely rewritten, as may be appreciated by the increase of pages, from 873 to 1,123, and of illustrations, from 569 to 715. As a whole, the book is reliable and should be in the hands of all students of metallurgy or metallurgical chemistry and all earnest workers in the practise of the art. The material is sufficiently comprehensive to give a thorough review of present metallurgical practises and the history of their development from early times.

JOSEPH STRUTHERS.

NEW YORK,
December 23, 1905.

SOME RECENT BOOKS RELATING TO ANALYTICAL CHEMISTRY.

A Text-book of Chemical Arithmetic. By H. L. WELLS, M.A., Professor of Analytical Chemistry and Metallurgy in the Sheffield Scientific School of Yale University. New York, John Wiley & Sons. Pp. vii + 169. 12mo. $1.25.

A Manual of Qualitative Chemical Analysis. By J. F. MCGREGORY, Professor of Chemistry and Mineralogy in Colgate University. Boston, Ginn & Co. Pp. xiv + 133. $1.00.

Techno-Chemical Analysis. By Dr. G. LUNGE, Professor at the 'Eidgenossische Polytechnische Schule' at Zurich. Authorized translation by ALFRED I. COHN, author of 'Indicators and Test Papers,' etc. New York, John Wiley & Sons. Pp. vii + 135. 12mo. $1.00.

Wells's Chemical Arithmetic.—The subject is treated under three general heads: 'Calculations Relating to Weights,' 'Calculations Relating to Gases' and 'Calculations Relating to Volumetric Analysis.' These chapters are divided into sections according to the special character of the problems, and the solution of each kind of problem is illustrated by examples. In addition, a number of problems to be solved are added, the answers to which are placed in the back part of the book. One of the most important features is the first chapter on approximate numbers. Those who have watched the average student carry out the calculations to eight or ten decimals when the result is defined to one or two decimals will appreciate this excellent presentation of the subject. Indeed, all through the book this matter is kept before the student and in many cases the last significant figure of a result is underscored to call attention to its being affected with uncertainty. There are also to be found in this chapter several pages on abbreviated multiplication and division and on the use of logarithms.

The book is designed for students of quantitative analysis and contains little that does not bear directly on analytical calculations. Arithmetical methods are used almost entirely. This the experience of the reviewer is against, as he has always found algebraic methods clearer and more concise. There is no section devoted to calculations involving the density of solutions, which must be looked upon as a serious omission in a work of this sort.

An appendix contains a small list of the usual tables and a table of five-place logarithms.

McGregory's Qualitative Analysis.—In the preface the author states that his aim is to strike between the larger works of the Fresenius type and the abbreviated texts. This would seem to be the aim of most authors of recent treatises on qualitative analysis, for the book at once impresses one as being of the same general size and shape as half a dozen others.

The treatment of the subject is also the conventional one as opposed to some of the later works that embody physical-chemical facts and speculations in explanation of the reactions involved. In arrangement, however, some special features are to be seen. For instance, the usual characteristic reactions are given for all the metals and non-metals before any analysis proper is reached. The usual schematic tables for the systematic examination are omitted, the author considering this better pedagogically.

For those who may prefer this peculiar arrangement the book is to be recommended.

Lunge's Technical Analysis.—A wide range of subjects is presented by this little book, there being chapters on technical gas analysis, fuels and heating and on inorganic chemical