and some Eastern languages, and, as translated by Schorlemmer and published by Vieweg, has been extensively used in German schools and colleges. This well-tested faculty of being able to put together a readable and well-proportioned text-book on general chemistry induced Roscoe to plan the far more ambitious "Treatise," the first volume of which, now under review, is in its fifth edition. The work first appeared in 1877, and fresh impressions were struck off at frequent intervals until 1894, when the book was completely revised and reprinted. It was once more brought up to date in 1905, and again in 1911. Its revision and the correction of its proof-sheets was the last considerable piece of literary work upon which Roscoe, then in his 79th year, engaged.

The undertaking, as originally designed, in conjunction with Roscoe's colleague Schorlemmer, who was to be more immediately responsible for the organic section, was planned on a scale which may justly be described as magnificent. In its format and general get-up, in the wealth and excellence of its illustrations, it reflected the broad-minded character and lofty views of its author. It was to appear simultaneously in England and Germany. The English work was never completed. Partly owing to Schorlemmer's death in 1892, but mainly to the very limited demand for a comprehensive work on organic chemistry which existed in this country forty years ago, that division of the book never got beyond a limited section of the aromatic compounds. The German edition was, however, completed by the late Professor Brühl, of Heidelberg, but it has not been thought expedient, as a publishing venture, to issue an English equivalent.

It is interesting to compare the present volume with its predecessor of 1877 and to note the changes which upwards of forty years of progress have necessitated. To begin with, the size of the book has grown from 771 to 968 pages. But this increase in bulk gives a very partial and inadequate idea of the actual amount of new matter. In the occasional resetting of the work considerable compression has been exercised, with a view of preventing the volume from becoming unwieldy and awkward to handle. Moreover, much that ought to be embodied in the text is relegated to footnotes, which in many cases do not go beyond mere bibliographical references. These are of no practical value to the student with little facility of access to a comprehensive library. As regards the historical introduction no very great changes have been made. It is still to a large extent based upon Kopp's *Geschichte*, with additions and corrections due to subsequent commentators. But it only carries the story to within a century of our own time, and accordingly omits all reference to what is of the greatest value and interest to those who would wish to trace, even in broad outline, the modern development of the science. No doubt this subsequent history is of great complexity and difficult of simple treatment. But the question arises whether in view of the existence of the many excellent histories of chemistry we now possess, most of them published since 1877, it is worth while to retain the partial and incomplete account which prefaces the volume. When the work is again reset, it is worth consideration whether the space which might be gained by its omission might not be better employed by the inclusion of matter at present hidden away in footnotes. A book which approaches 1000 8vo pages tends to become irksome to handle, and this question of space will, with time, become increasingly pressing. Something might be gained by the omission of the very elementary matter which finds a place among the earlier pages of the book. With the more general introduction of the teaching of chemistry into our schools the pupil is made familiar with such fundamental concep-

tions as the indestructibility of matter, the nature of chemical action, the value of the experimental method, etc., and he learns of these and similar basic principles in text-books costing much less than 30s. Of course, even much that may be considered fundamental and elementary is by no means immutable, but no hint of possible or prospective developments is contained in the section referred to which remains in this respect exactly as written more than 40 years ago.

Excellent as the illustrations are, it may be doubted whether in the interests of space all of them should be retained. Some are obsolete and possess only a limited historical interest; others occupy a needless amount of room. One recognises lecture-table apparatus, devised half a century ago by Roscoe's faithful *famulus* Heywood, well known to Owens' College men, much of which has been replaced, in lecture illustrations, by other and simpler contrivances. The arrangement shown on p. 620 no longer represents the process by which phosphorus is manufactured, although a short description is given of the Readman Parker-Robinson system. No account is afforded of the Frasch process of extracting sulphur which has been so extraordinarily successful in America, although it is stated that the output of American sulphur exceeds that of Sicily.

The general plan of the work is so sound that no pains should be spared to maintain its position as the leading treatise in the language. This position can only be assured by timely revision and the excision of obsolete matter. Roscoe during his lifetime acted wisely in associating himself with younger men, in whom he had confidence, in this business of revision. He thereby contrived to impart to his work a perennial modernity and to render it, as far as possible, a faithful reflex of the spirit and knowledge of the time.

Dr. Cain, in bringing out this new edition, has had no light task, and, on the whole, he may be congratulated on the manner in which he has fulfilled it. In striving, as he says, reverently to preserve the general character and style of the book he has had to contend with the proverbial inconvenience of putting new wine into old bottles. Nevertheless he has succeeded in incorporating or noting practically everything of importance concerning the non-metallic elements and their compounds which has appeared since the last edition was published, although we venture to think the "tyranny of space" has compelled him here and there to express himself less fully than he could have wished.

T. E. THORPE.

TECHNICAL METHODS OF ORE ANALYSIS. By A. H. LOW. *Eighth edition, revised and enlarged.* Pp. 338. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd. 1919.) Price 10s. net.

The new edition of this already well-known and useful book contains several additions which will be of interest to those dealing with the analyses of the particular elements referred to, especially those on uranium, tungsten, molybdenum and potassium.

The author has in many cases taken great pains to give minute details for the successful carrying out of the methods described, and added many personal observations of value to the operator; but it is to be regretted that although the book is intended for the student as well as for the technical chemist, no mention is made in certain cases of well-known and much used methods or variation of methods. As instances one might mention the quick and accurate distillation method for arsenic, which is particularly useful for the determination of comparatively small amounts in certain ores, and more especially in some metals and alloys (the analysis

of the latter being dealt with to some extent in the book as well as ores). Again, in the case of gravimetric phosphorus determinations, the author always finishes by weighing the ammonium phosphomolybdate on a tared Gooch crucible, an admittedly accurate method, but no reference is made to the exact and easy method of finishing by conversion to lead molybdate with which a student will often get better results than by weighing the phospho-molybdate, owing to the ease with which the precipitate can be handled and ignited, and the fact that the phosphorus equivalent is even smaller than in the former method. In the case of molybdenum, again, no reference is made to gravimetric assay by determination as lead molybdate.

With regard to the additional matter in the appendix, it may be pointed out that in what is described as "Watt's" method for determining tungsten in ores, a certain amount of tungsten is almost invariably retained in the residues under the conditions of opening up, when using ammonia for extraction, whether the ore be completely opened up or not, and that for the re-treatment 25 per cent. caustic soda solution should be used, the residues being digested on the hot plate until completely decomposed, and the small remaining amount of tungsten estimated by the usual mercurous nitrate method, in place of the aqua-regia and ammonia re-treatment. With some types of tungsten ore, especially those containing titanium minerals, a low result would be obtained by Watt's method as described.

In the note on uranium on page 376 of the appendix, it is stated that a yellow filtrate from the ammonium uranate indicates incomplete precipitation. This is true, but it might be pointed out that the solution need not be noticeably yellow to hold sufficient uranium (especially if the bulk has increased appreciably by the addition of washings) to render the result of a 1 or 2 per cent. carnotite ore appreciably low; and that it is safer to treat the filtrate in any case by acidifying slightly, boiling, and precipitating again with ammonia, using water perfectly free from carbonic anhydride throughout, and allowing to settle and examining the bottom of the flask after five or ten minutes for any further small quantity of ammonium uranate. On the same page there is a printer's error in line 22 (U_2O_3 , instead of U_3O_8) and repeated on line 28; but speaking generally the book is well and clearly written, and contains but few clerical or printer's errors.

BENEDICT KITTO.

COCOA AND CHOCOLATE: THEIR HISTORY FROM PLANTATION TO CONSUMER. By A. W. Knapp. (London: Chapman and Hall, Ltd. 1920.) Price 12s. 6d. net.

Mr. Knapp, research chemist to Messrs. Cadbury Bros., has written an entertaining but thoroughly well-informed work on the history, cultivation, and manufacture of cocoa. In a happy vein he discourses of the Spaniards' discovery of the chocolate beverage in Mexico and of the dainty seventeenth century chocolate houses in London. Even the statistical matter is enlivened by a ready imagination and by the use of diagrams. Illustrations, maps, and diagrams are alike admirable.

For the general reader this is quite the best book that has yet appeared, and the technical reader will find much of interest, including frequent references in the text to scientific and agricultural publications, and an excellent bibliography. Mr. Knapp is equally at home on the plantation and in the factory; on the Gold Coast or in the West Indian Islands. In his vivid descriptions of the orchards, the collection of pods, and curing of beans

he has succeeded, as no previous writer has done, in conveying something of the remarkable charm of the cocoa grove. A humorous dialogue between a planter and manufacturer brings out the special qualities of cocoa beans desired by the latter. The rapid growth of the cultivation of cocoa by peasant proprietors on the Gold Coast is described; it constitutes one of the most remarkable chapters in the chronicles of tropical agriculture.

We offer two slight criticisms. The illustration of a criollo cocoa-pod, given on p. 27, is scarcely typical, and the least satisfactory section of the book is, perhaps, that on cocoa fermentation. Following the description of the alcoholic fermentation with yeasts, no allusion is made to the important part played by acetic acid bacteria in the normal course of fermentation, if this is prolonged beyond the third or fourth day.

OBITUARY.

LEONARD PHILIP WILSON.

By the sudden and unexpected death of Leonard P. Wilson on October 16, after an operation for appendicitis, applied chemistry is deprived of an investigator of the first rank, and the societies with which he was associated have lost a valued member.

Mr. Wilson, who was born in 1879, was educated at St. Dunstan's College, Catford, and gained a Clothworkers' Scholarship to the City and Guilds' Central Technical College, South Kensington, where he became Leathersellers' Research Fellow and Associate in 1899 and Fellow in 1912. After holding appointments with Messrs. Wilkinson, Heywood, and Clarke and the Vacuum Oil Company, he joined Messrs. Courtaulds, Coventry, as chemist in 1906, and at his death was the chief chemist on the staff. The development of the artificial silk industry and of Messrs. Courtaulds shows the part played by Mr. Wilson in the investigation of the problems of the industry. He was the author of numerous patents and papers in connexion with artificial silk and other subjects, and served on the Patents Committee of the Association of British Chemical Manufacturers. Mr. Wilson took great interest in the welfare of local scientific societies, and as chairman of the Birmingham Section of the Society of Chemical Industry he won the respect and admiration of all the members. The value of his services was recognised in his appointment last year as one of the vice-presidents of the Society.

R. S. MORRELL.

PUBLICATIONS RECEIVED.

THIRD REPORT ON COLLOID CHEMISTRY AND ITS GENERAL AND INDUSTRIAL APPLICATIONS. *British Association for the Advancement of Science. Department of Scientific and Industrial Research.* Pp. 151. (London: H.M. Stationery Office. 1920.) Price 2s. 6d.

PLANTATION RUBBER AND THE TESTING OF RUBBER. By G. STAFFORD WHITBY. *Monographs on Industrial Chemistry*, edited by Sir E. THORPE. Pp. 559. (London: Longmans, Green and Co. 1920.) Price 28s.

HOO CANNEL. By F. S. SINNATT and M. BARASH. *Bulletin 6, The Lancashire and Cheshire Coal Research Association*, 1920. Price 1s.