

popular with students of medicine in the last ten years, and, like the others, it is arranged in the form of questions and answers. As a matter of necessity the information it presents is very greatly condensed, furnishing often not more than an outline of the subject. It is, therefore, in extent, just about what the student needs and uses when "cramming" for an examination. It is possible that books of this class may be legitimately used, and thus possess for the student a real value, but in general their use is to be regretted as tending to encourage superficial reading. The present book seems to be, in the main, carefully compiled, and as free from error as can be expected with such condensation. A careless statement, or mistake, is found at the bottom of page 203, however, where it is said that potassium salts convert uric acid into the more soluble urea. The accuracy of the statement on page 206, regarding the solubility of lithium urate, is also questionable. J. H. LONG.

A MANUAL OF CHEMICAL ANALYSIS; QUALITATIVE AND QUANTITATIVE.
BY G. S. NEWTH, F.I.C., F.C.S., Demonstrator in the Royal College of Science. London: Assistant Examiner in Chemistry, Science and Art Department. New York, London, and Bombay: Longmans, Green and Co. 1898. xii + 462 pp. Price, \$1.75.

To all who value the previous works by Newth, "Chemical Lecture Experiments," and his two text-books on "Inorganic Chemistry," the appearance of the present manual on analysis will certainly be most welcome. As might naturally be expected from its predecessors, the manual is replete with modern methods of manipulation, clever devices to simplify time-honored reactions, and clear, concise explanations. The fundamental processes of quantitative analysis are accompanied by a wealth of illustration, which should enable the dullest intellect to grasp the successive steps in weighing, filtering, the incineration of filters, the ignition of crucibles, etc. These features could be confidently counted upon in advance.

The plan of the work is of course open to criticism. The qualitative part, which includes a fairly generous treatment of the rarer elements, and less common acids, occupies 188 pages; gravimetric and volumetric quantitative analysis extend also over 188 pages; gas analysis covers 37 pages, ultimate organic analysis, 20 pages; and physico-chemical determinations 10

pages. Whether it is desirable to place a manual of this size in the hands of the beginner in qualitative analysis will be a moot question, in the future, as in the past. Dr. Caldwell has solved the question to some extent in his manual of analysis, limiting the qualitative work to the more common bases and acids, and the quantitative feature to ten or fifteen of the more typical determinations. Frequent editions show that the book has met a distinct need. Dr. Muter and Dr. Long have each published successful manuals on a somewhat more extended scale, providing for medical and pharmaceutical students all necessary qualitative and quantitative instruction in a single volume. The writer doubts the expediency of placing a manual of the nature of Professor Newth's, in the hands of those who have no intention of advancing beyond a course in qualitative analysis. The abundance of detail, and the fact that over one-half of the contents of the book will never be put to practical use, seriously handicap its value for the ordinary college student. On the contrary, he regards it as admirably adapted for the present and prospective needs of such students as take up qualitative analysis as preliminary to more advanced laboratory work in chemistry. For such, the combination in one volume of directions and data covering the whole field of analysis is attended with manifest disciplinary and practical advantages. He has, in fact, not delayed to adopt at once, the manual under consideration, for the use of this category of students in his laboratory.

The arrangement of material is, as a rule, logical and satisfactory. In the qualitative part the important tests for each member of a group of bases, are first given and then the systematic treatment of the group follows, accompanied by a clear scheme. While detail is well worked out, it would seem as if the provision for a more compact and comprehensive survey of the entire field could be improved. Thus on page 16 is the general division of bases into groups; on page 17 is a table of the precipitates given by each group reagent. Group schemes are scattered through the following 160 pages. Then comes, *at the end*, "preliminary tests and operations," forming Chapter XVI. This chapter could advantageously contain a complete schematic summary of all tables given before for the detection of both bases and acids. Such an arrangement, similar to that which gives

such value to the "Tabellen" of Will or Wallach in German, would vastly facilitate the use of Newth's manual for young and unformed minds.

The author has omitted argon and helium from the list of elements, with their atomic weights, and probably wisely, in view of the astonishing group of elementary gases isolated from argon during the past few months. The use of didymium in the same list, and the absence of neodmium, and praseodymium is a bit of conservatism hardly in keeping with the progressive nature of the book.

The number of novel and ingenious devices for carrying out qualitative tests, such as that on page 84 for securing the CuCl_2 flame, will render the book most helpful and attractive to young minds. Newth's declination on page 157, to describe odors, is eminently wise and recalls the great amusement which greeted a foreign chemist's recent account of a substance which possessed a "blumenartigen Geruch."

It is to be hoped that our American chemists will follow Newth's example, in adopting the system of standard reagents, devised by Reddrop.¹ In this system all laboratory reagents carry signatures indicating whether they are normal, or multiples or fractions of normal solutions. Thus about one-half of our ordinary reagents are strictly normal, = N; calcium sulphate is $\frac{N}{30}$; sodium hydroxide is 5 N, etc. In this connection Professor Newth could well designate a saturated solution of $\text{Ca}(\text{HO})_2$, as $\frac{N}{270}$, and not prefix the qualification "about."²

While the manual has so many pronounced features of exceptional excellence it is not free from certain flaws and errors inevitable in a first edition. Thus in the list of reagents just referred to, we miss H_2PtCl_6 , $\text{K}_2\text{Cr}_2\text{O}_7$, $\text{NaHC}_4\text{H}_4\text{O}_6$, etc. although directions for their use are given in several places.

Provision is made in this list for a normal solution only of ammonium sulphate, while on page 35, the directions call for a *strong* solution. Among faulty expressions, scarcely admissible in a college text-book, are "nearly soluble in alcohol," p. 23; "it is therefore *only* possible to have an aqueous solution of the ortho-acid," note p. 93; "bring the liquid once more *to the boil*,"

¹ *Chemical News*, May, 1890.

² Cf. Golding: *J. Soc. Chem. Ind.*, 17, 125.

p. 48. The statements on p. 166 with regard to silicic acid, assigning H_2SiO_3 as the formula of the gelatinous precipitate and H_4SiO_4 as the formula of the soluble acid only, are not in harmony with the results of recent investigations in the writer's laboratory.¹ Both tartaric acid and hydrogen sodium tartrate, are used in testing for ammonium salts (p. 21), but the second reagent only is advised for potassium compounds.

The following omissions of analytical data should be remedied in a second edition; on p. 88, the frequent presence of sulphur in the residue of HgS , $PbSO_4$, and $Hg(NO_3)_2 \cdot 2HgS$, is overlooked; on p. 70, a method for the separation of glucinum, zirconium, titanium, and uranium should be outlined; on p. 128, no mention is made of Hart's excellent method for mixtures of chlorides, bromides, and iodides; on p. 151, no mention is made of the combustibility of all hypophosphites—their most striking property; on p. 155, no mention is made of the reaction of formates with ferric chloride, nor of the prompt reaction with silver nitrate; on p. 169, the familiar test for silica, etc. by means of calcium fluoride and sulphuric acid is omitted; on p. 151, the deportment of metaphosphates with ammonium molybdate is not stated; on p. 171, pyrophosphoric, metaphosphoric, phosphorous and hypophosphorous acids are omitted from the general scheme for the systematic detection of acids, although such a rare acid as $HCNO$ is included.

Despite these minor blemishes, the book marks a distinct advance in the evolution of the ideal manual of analysis, and will certainly find many friends. THOMAS H. NORTON.

AN INTRODUCTORY COURSE OF QUANTITATIVE CHEMICAL ANALYSIS WITH EXPLANATORY NOTES AND STOICHIOMETRICAL PROBLEMS. BY HENRY P. TALBOT, Ph.D., Professor of Analytical Chemistry in the Massachusetts Institute of Technology. Third Edition, Revised and Enlarged. 153 pp. New York: The Macmillan Co. 1899. Price \$1.50.

That a third edition should be demanded in less than two years from the first appearance of this book, is evidence that many teachers have found it suited to their needs. To all the matter contained in the first edition, the present adds the determination of carbon dioxide in dolomite, the determination of silica in laumontite and in feldspar, reference to the determination of zinc

¹ This JOURNAL, 19, 832.