

science to liberal education, on research in classroom procedures, on the content of science courses, on science rooms and equipment, and the education of science teachers which the space allowed by the editor does not permit me to discuss.

It is most regrettable that a report containing so much that is constructive and exceptionally valuable must be judged as prejudicial to the progress of science teaching, in high schools at least, because of its inadequate conception of the desirable, vital, and actually realizable aims of such teaching; aims which are being realized in an appreciable though not precisely measurable degree by scores of science teachers in the New York City high schools.

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The Preparation of Pure Inorganic Substances. E. H. ARCHIBALD, Professor of Analytical Chemistry, University of British Columbia. John Wiley and Sons, Inc., New York City, 1931. x + 383 pp. 20 Figs. 22 × 14 cm. \$3.75.

In the preface to this work, Professor Archibald says: "The past thirty years have seen a marked advance in the precision and accuracy of physical and chemical, as well as other scientific measurements. In order to take advantage of these improvements, it is frequently necessary for the student to supply substances of a much higher degree of purity than corresponds to our "c.p." products. Fortunately, during these thirty years, many methods have been devised, and a great many principles have been set forth, according to which the purification of a large number of chemicals can be effected. What are thought to be the more dependable and simple of these methods are set forth in the following pages."

This book is a guide for students and chemists desiring to prepare inorganic substances of a very high degree of purity. It is evidently intended primarily for research workers. The manual does not contain

much theory and only a few chemical equations are given. It covers a wide field.

Chapter I deals with Purification Processes and Apparatus Material. Among methods of purification, the importance of washing by repeated stirring with small quantities of water and subsequent centrifuge treatment is discussed.

As containing vessels, such substances as ordinary glass, Pyrex or Jena glass, porcelain, fused silica, and platinum are considered.

The remaining chapters (II–XVII) are devoted to the preparation of substances, the periodic classification of the elements being followed. For instance, Chapter II deals with the zero group—helium, neon, etc. Chapter III is devoted to the alkali metals and hydrogen, while the last chapter treats of manganese and of the elements in Group VIII.

The directions are clear and simple and are taken largely from the literature of chemistry, numerous references to which are given at the bottoms of the pages. It is interesting to note the great number of references to papers published in the *Journal of the American Chemical Society*, and to the many investigations carried out at Harvard under the direction of the late Professor Richards and Professor Baxter and their co-workers.

There are a number of preparations of compounds of the less common elements and of the rare earth metals. More preparations might have been included had space permitted. For instance, only two pages are devoted to preparations of arsenic, and none of the sulfides or thio-compounds of this element is included.

The book is a scholarly production and affords evidence that the author is familiar with the literature of inorganic chemistry and has had much experience as teacher and investigator.

Some readers may object to the use now and then of "barium hydrate" for the more modern term "barium hydroxide" (pp. 19 and 38).

The manual is well printed on good paper and the binding is excellent.

The reviewer believes that the book will be a useful and reliable guide for research students and chemists, and that it will prove to be a valuable addition to chemical literature.

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A Course of Qualitative Chemical Analysis of Inorganic Substances. OLIN FREEMAN TOWER, Ph.D., Western Reserve University. Sixth edition. P. Blakiston's Son & Co., Inc., Philadelphia, 1932. xv + 92 pp. 1 Fig. 15 × 23 cm. \$1.50.

This book, intended for students beginning the study of qualitative analysis, retains the same general form followed in the earlier editions. Instead of the usual preliminary experiments intended to acquaint the student with the analytical reactions of the different ions, whose separation and detection are to be determined later, the student is directed to prepare mixtures of these ions and carry them through the methods of analysis. Such a procedure is undoubtedly more interesting and probably just as profitable to the student. Little attention is given to the writing of equations and to explanations of the chemistry involved in the different processes, though numerous references are given to the general chemistry texts by Holmes and by McPherson and Henderson. Sixteen pages at the beginning of the book are devoted to a discussion of the mass law principle and how it affects an equilibrium. This discussion is quite clear and readable and should be easily understood by the beginning student.

The main body of the text is devoted to the analytical procedure and explanatory notes. These are arranged on opposite pages so that the notes may be readily consulted, yet do not tend to destroy the continuity of the procedure. Except in the aluminum-iron group, the classical procedure is used for the cation analysis. Following the precipitation of the copper-tin group, aluminum, chromium, and iron

are precipitated as a separate group with ammonia after oxidation of the iron with nitric acid. The remainder of these elements, zinc, manganese, cobalt, and nickel, are then separated as sulfides. The classical method of procedure is, however, outlined in the appendix. The anion analysis consists of certain preliminary tests, followed by individual tests based on the knowledge gained from the preliminary tests.

The book is well written, free from typographical errors and is well adapted to the teaching of qualitative analysis, especially from the standpoint of the analyst.

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Analytical Factors and Their Logarithms.

EARLE RADCLIFFE CALEY, M.Sc., Ph.D., Assistant Professor of Chemistry in Princeton University. First edition, John Wiley and Sons, Inc., New York City, 1932. v + 112 pp. 13 × 19 cm. \$2.00.

The purpose of this book is to furnish, in a readily accessible form, a comprehensive set of chemical factors for the convenience of analysts. The book consists of twelve tables containing factors and their logarithms, followed by a short chapter of instructions for the use of these tables.

Table I consists of the International Atomic Weights for 1931 and Their Logarithms.

Table II contains the Inorganic Gravitric Factors arranged in the usual form. In the left-hand column of this table are given the formula of the substance weighed, its molecular weight, the logarithm of this weight and the appropriate temperature for the ignition of the compound. The inclusion of the ignition temperature in such a table is an entirely new feature inaugurated by the author and adds materially to the value of the table. The following columns contain, in order, the formulas of the substances sought, the factors for these substances and the logarithms of the factors. This