

The following tentative qualitative test, while not conclusive, will give a strong indication of the presence of diethylphthalate.

Evaporate 100 cc. of the suspected alcohol to a small bulk. Pour in a large volume of water to which a few cubic centimeters of sodium hydroxide solution has been added. If diethylphthalate is present a milky cloud of the denaturant will develop. Confirming tests may be made on the boiling point. Diethylphthalate boils at 290° to 297° .

The detection of the fallacy of the Government test is important in as much as it has been the cause, within the writers' experience, of condemning large quantities of ethyl alcohol which were later shown to be free from diethylphthalate.

THE CHEMICAL TECHNICAL LABORATORIES
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NEW BOOKS

Quarterly Journal of the Indian Chemical Society. Volume I. Issue No. 1, September 30, 1924. All communications to be addressed to Dr. J. N. MUKHERJEE, Secretary, Indian Chemical Society, 92, Upper Circular Road, Calcutta, India. Calcutta University Press. 122 pp. Illustrated. 24.5×16 cm. Price of a single issue, 4 rupees. Annual subscription for non-members, 16 rupees.

The recent formation of the *Indian Chemical Society* and now the establishment of its *Quarterly Journal* are evidences of the activity with which chemical research is now being carried on in India. How appropriate it is that in this country, where so many of mankind's earliest chemical discoveries were made, the science of chemistry should again flourish!

There are thirteen articles in this issue. They are devoted entirely to accounts of original researches, for the most part in pure chemistry, but widely distributed among the various branches of the science—organic, inorganic, physical, bio- and thermo-chemistry.

The Editors are Drs. N. R. Dhar of Allahabad and E. R. Watson of Cawnpore.

It is a pleasure to welcome this new accession to the ranks of the Journals of Chemistry.

ARTHUR B. LAMB

Lunge and Keane's Technical Methods of Chemical Analysis. Edited by CHARLES A. KEANE, D. Sc., Ph.D., and P. C. L. THORNE, M.A., M.Sc., of the Sir John Cass Technical Institute, London. Second edition. Vol. I. D. Van Nostrand Company, 8 Warren Street, New York, 1924. xx + 702 pp. 215 figs. 24.5×17 cm. Price \$18.00 net.

Those who are familiar with the previous edition of this important work will probably find difficulty in recognizing the first volume of the present edition. It undoubtedly deserves more thorough investigation than is

given the usual "revision." Sections in the first volume are written by a number of distinguished British analysts, men who with the exception of Dr. Keane, did not collaborate in the preparation of the first edition. The first 227 pages are concerned with the general methods used in technical analysis. This introduction applicable to all the projected volumes is followed by sections on technical gas analysis, fuel analysis, analytical processes involved in the manufacture of sulfurous, sulfuric and nitric acids, chlorine, sodium carbonate and hydroxide and finally 40 pages on cyanogen compounds.

It is difficult to review a book as inter-related as the individual volumes of this work are certain to be, before the complete edition is available, but the first volume is of commendable excellence. For the information of American technical analysts it should be stated, however, that the revised edition has the appearance of being better suited to foreign than to American industrial conditions. As is stated in the preface regarding the first edition, the second edition is also "adapted to English conditions of manufacture by. . . specialists fully familiar with the methods of work in use in this country."

It is evidently the intention of the authors to include expositions of the rapid approximate methods of analysis which necessarily characterize the work in many control laboratories, since in the introduction it is stated "technical methods of chemical analysis include many general analytical methods together with certain practical tests which have been devised to meet the requirements of the manufacturing processes of chemical industry. The latter comprise a number of methods which now form a recognized part of analytical chemistry, but which were originally looked upon as purely 'technical' methods." It is the opinion of the reviewer that this attempt has not been successful, at least as far as American "technical analysis" is concerned. In the section on physical measurements employed in technical analysis, for example, numerous complete or partial omissions in connection with the testing of hardness, tensile strength, color and in carrying out electrometric titrations, are evident.

It is not contended that no attempt has been made to adapt the present edition to American conditions, for several American procedures and forms of apparatus are given, but in many cases the treatment is inadequate; for example, the description of the Dionic Water Tester occupies nearly one and one-half pages, while all other forms of electrometric apparatus are dismissed in 11 lines. In the section on gas analysis, Haldane's apparatus for the analysis of mine air is described in considerable detail, but no mention is made of the contributions of our Bureau of Mines to this determination. Concerning the combustion of hydrogen, carbon monoxide and methane by means of incandescent platinum spirals in a gas pipet, it is stated, "contact with the gaseous mixture by the spiral is not very adequate

and an explosion is very likely to occur unless the mixtures are led very slowly into the pipet." The reviewer has conducted or supervised several hundred analyses by this method without experiencing the objection noted. The use of such apparatus as buret floats, druggists' hand scales, antiquated hand crushers, the omission of several familiar types of filtration media, of potassium hydrogen phthalate as an acidimetric standard, are random but typical details not likely to contribute to the usefulness of the book in some analytical laboratories in this country.

As a general reference treatise of industrial analysis, the projected work promises to be of great value to the practical analyst and the teacher of analytical chemistry, but it cannot be expected to provide any one in this country with modern rapid analytical procedures as successfully as a collection of the more highly specialized books and pamphlets now available.

C. R. HOOVER

Fundamentals of Chemistry. By CARL WILLIAM GRAY, CLAUDE W. SANDIFUR AND HOWARD J. HANNA. Houghton Mifflin Company, Boston, New York, Chicago, San Francisco, 1924. ix + 456 pp. 197 figs. 19.5 × 13 cm. Price \$1.68 postpaid.

The two most striking features of this text are its illustrations and its order of presentation. No fewer than 197 line drawings, freehand sketches and photographs are included, and the great majority of them are so clear and apposite that it must be a dull student whose interest is not stimulated or whose comprehension of the subject matter is not greatly assisted thereby. The order of presentation, however, is so extremely original as to be confusing. The argument of the authors that the familiar (for example, the metals, Chapter 3) should precede the unfamiliar (for example, the halogens, Chapter 35) may be accepted as sound in principle, but that Gay-Lussac's law (p. 113), Avogadro's hypothesis (p. 114) and problems on the 22.4 liter box (p. 163) should be developed before the simple gas laws (pp. 168-172) is certainly debatable.

The treatment throughout is primarily descriptive, and the beginner is expected to take many things (such as the molecular and atomic theories) entirely on faith. More emphasis on the quantitative side would seem necessary at certain points, normal and molar solutions, for example, being relegated to the appendix. Nevertheless, the student is asked to understand, *at sight*, complex diagrams on atomic structure in connection with ionization (pp. 100-101). Many of the definitions given are misleading, such as "a hydrate is a compound formed by loose chemical union with water" (p. 63), "mass action is the disturbing of chemical equilibrium" (p. 438).

All these, however, are minor matters which can be corrected in a subsequent printing. The simplicity of its style and the attractiveness of its illustrations will, no doubt, make the book a popular introductory text.

JAMES KENDALL

Laboratory Manual. By CARL WILLIAM GRAY AND CLAUDE W. SANDIFUR. To accompany Gray, Sandifur and Hanna's "Fundamentals of Chemistry." Houghton Mifflin Company, Boston, New York, Chicago, San Francisco, 1924. xii + 137 pp. Illustrated. 19 × 23.5 cm. Price 92 cents, postpaid.

This laboratory manual contains 84 experiments and ten pages of qualitative analysis. The directions are detailed and clear and numerous questions are interposed to ensure the proper correlation of laboratory with lecture work. The experiments cover a very wide range, including "the analysis of a patent medicine for the alcoholic content," "the preparation of gun cotton and collodion" and other topics generally considered as of interest to adults only. With careful supervision on the part of the instructor, to prevent the performance of the experiments as a mere succession of isolated stunts, the manual should constitute a very satisfactory companion to the main text.

JAMES KENDALL

Introduction to General Chemistry. By WILLIAM FOSTER, Professor of Chemistry in Princeton University. Princeton University Press, Princeton, New Jersey, 1924. v + 643 pp. 145 figs. 21.5 × 14 cm. Price \$3.50 net.

Professor Foster has not yielded to the prevalent theory that in a text on the introduction to general chemistry the interest of the student must first be secured by appealing to his everyday experiences and by the use of a flowing, readable style of presentation, even at the expense of a strictly logical development of the subject. Neither has he followed that modern cult which seems to hold that the aim of a text in elementary chemistry is to present those fundamental principles which are popularly called physical chemistry and to introduce the descriptive material of inorganic chemistry incidentally to these principles, as illustrative examples. On the contrary, avoiding both of these tendencies of other recent books, he offers a highly conservative presentation, so full of pure unadorned information, so clearly expressed, so logically developed that it must appeal to the scholarly chemist as among the best publications of its type.

The first forty-six pages of the book are devoted to definitions, the gravimetric laws and the use of chemical formulas and equations. The author states that he has "no apology to offer for the early introduction of chemical formulae and equations" but that "long experience with thousands of students has led him to believe that, on the whole, more is gained than lost by the early use of the 'tools' of the chemist."

The very liberal use of these "tools" from the first make the pages devoted to the descriptive side of the subject appear formidable to a beginner, particularly as the subject matter is generally broken up into short paragraphs, with few detailed explanations. Industrial processes, while adequately outlined, are not emphasized in detail. The emphasis is distinctly on the side of pure chemistry.

The discussions of principles and theories, such as the significance of the gram molecular volumes of gases, ionization and the properties of solutions are remarkably clear and concise expositions. The chapter on the structure of matter, in particular, sets forth the present state of our knowledge and hypotheses with wonderful simplicity.

At the conclusions of the chapters are exercises, references to fuller texts and, in the case of the earlier chapters, summaries which should be of value to students. Twenty-six full page portraits and biographical sketches of eminent chemists add greatly to the attractive appearance of the volume.

Competent and experienced teachers will undoubtedly find this text one which they may put into the hands of their students with confidence that it contains all they may expect them to know. The arousing of vital interest in the subject of chemistry, however, must depend upon the inspiration of the teacher. The author states that he has found the text "teachable," but the reviewer feels that it is only by expert teaching that it will become "learnable."

KENNETH L. MARK

A Laboratory Manual in General Chemistry. By WILLIAM FOSTER, Professor of Chemistry in Princeton University. Princeton University Press, Princeton, New Jersey, 1924. ix + 205 pp. 33 figs. 21.5 × 14 cm. Price \$2.00 net.

In this manual, as in the text by the same author, which it is designed to accompany ("Introduction to General Chemistry," Princeton University Press, 1924), the fundamental procedures upon which the later work depends are first thoroughly covered.

Exercises upon measurements expressed in metric units are followed by detailed directions for making weighings to an accuracy of a tenth of a milligram, the last figure being determined by the amplitude of the swing on each side of the zero point. The advisability of demanding from beginners this degree of accuracy in weighings may be questioned by many teachers, but all will agree that a laboratory for elementary work is unusually well equipped which can provide the necessary balances and calibrated weights.

Practice in the use of a buret is obtained in connection with the determination of the density of water; but the author misses his opportunity to bring out in this experiment the important principle of proportional accuracy as illustrated in the comparison of the error involved in reading the volume of the water with that in obtaining its weight.

The unusually large number of quantitative experiments, both gravimetric and volumetric, accords with the character of the laboratory course as a whole, which is one qualified to lay a sound foundation for the continuation of the study of chemistry.

In addition to the standard descriptive experiments generally included

in elementary laboratory work, exercises are incorporated upon electrolytic dissociation, chemical equilibrium, oxidation and reduction, solubility product, hydrolysis and colloidal solutions. More attention is given to blowpipe analysis than is commonly done, and the last exercises in the book are devoted to typical methods of qualitative analysis. Altogether, the author believes, "there is sufficient material in the manual for five or six hours of laboratory work weekly for an academic year, even for those who have offered chemistry for entrance."

Although the directions are very clear and in many cases detailed, the student is occasionally directed to consult the instructor before proceeding. Indeed, many of the experiments offer an opportunity to the student to acquire familiarity with a greater variety of apparatus and to develop greater manipulative skill than is often demanded of beginners.

The manual as a whole is a worthy companion to the text upon which it is based.

KENNETH L. MARK

Exercises in General Chemistry. By HORACE G. DEMING, Professor of Chemistry, University of Nebraska, assisted by SAUL B. ARENSON, Instructor in Chemistry, University of Nebraska. John Wiley and Sons, Inc., New York; Chapman and Hall, Limited; London, 1924. xiv + 247 pp. 32 figs. 22 × 14 cm. Price \$1.80 net.

To the title of this manual, which is designed to accompany "General Chemistry" by Horace G. Deming (John Wiley and Sons, 1923), might well be added the phrase "and an Outline of Qualitative Analysis," since nearly a third of the volume is devoted to this subject. The first two-thirds of the book contains the descriptive exercises commonly to be found in manuals arranged for an elementary course and in addition it contains a number of new and ingeniously simple experiments, mostly illustrative of general principles. A fairly large number of quantitative experiments are also included.

The arrangement of the book is one, in the opinion of the reviewer, highly to be approved. Under each experiment are the headings Reference, General Statement, Materials and Directions. The "General Statement," in which the purpose of the experiment is set forth, might well be expanded to include a brief summary of the matter discussed in the "Reference." Although theoretically the student is expected to read the "references" before beginning work, many teachers, realizing the difficulty of enforcing this requirement, would welcome the embodiment of the essential information where the student could less easily escape it.

In the directions themselves the authors have avoided the common mistake of sacrificing clearness for brevity. Many numbered questions are interpolated, the answers to which are to be recorded opposite the

corresponding numbers in blank spaces left at the end of each experiment. The answers to these questions constitute the notes on the experiments. This method of note taking has been found in the experience of the reviewer to give very satisfactory results, as it guides the beginner to differentiate the essential from the non-essential, and it enables the instructor to see at a glance whether or not the student has understood his work.

The directions as a whole show that great care has been used in working out the details of the experiments. Provision has been made for students who offer chemistry for admission and who are not required to repeat the simpler experiments performed in a high school course in chemistry.

KENNETH L. MARK

Chemistry in Everyday Life. By FREDERIC B. EMERY, Harrison Technical High School; ELZY F. DOWNEY, Crane Technical High School; ROSCOE E. DAVIS, Lane Technical High School; and CHARLES E. BOYNTON, M.D., Waller High School, Chicago. Lyons and Carnahan, 221 East 20th Street, Chicago; 131 East 23rd Street, New York; 1924. xiii + xlv + 667 pp. 217 figs. 19 × 13 cm. Price \$1.76.

One way of meeting the problem of how best to present such difficult conceptions as the derivation of atomic weights, the kinetic theory and vapor pressure is to omit entirely a discussion of these subjects. As a result is obtained a chemistry which resembles near-beer; it is all there but the spirit. In the text prepared by these Chicago High School teachers no attempt is made to develop the reasoning power of the student. The book and the teacher must be taken as the ultimate authority. Whether or not this point of view is the one best adapted to high school students, who are familiar with it in their other studies, the reviewer is not competent to judge; but he has found in his many years of experience in teaching freshmen in college, that high school graduates are as undeveloped in their ability to think as they are proficient in their ability to memorize. May not this method of teaching science be partly to blame?

"Chemistry in Everyday Life" is divided into two nearly equal parts. The first part, devoted to pure descriptive chemistry, the authors state is adequate to meet the college requirement in chemistry; the second part consists of rather detailed chapters upon industrial processes and other applications of chemistry, such as "Preservation and Dyeing of Foods," "Soaps, Laundry Chemistry and Chemical Cleaning," "Paper and Ink," "Leather and Tanning," "Medicines and Patent Medicines." These accounts, which are clearly and interestingly written, are illustrated with many well chosen pictures and diagrams. They are much more detailed than those commonly to be found in elementary texts.

The book is one which high school teachers will find helpful in presenting to their classes the applications of chemistry, and one to which they may refer their students even though another textbook is being regularly used.

KENNETH L. MARK