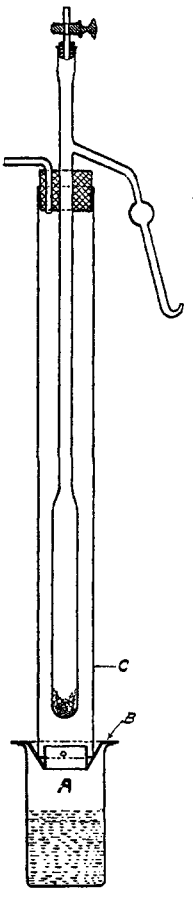

A plain beaker, *A*, takes the place of the bulb. It is provided with a copper cover, a cross-section of which is shown at *B*. The collar in the center should be of such size that the smallest tube which is to serve as a jacket will readily slip over it. The deep groove around the collar, made broad enough to take the widest tubes, serves as a water seal for connecting the outer jacket *C*. The liquid condensing on the walls of the outer tube automatically fills this seal, and the collar should be provided with several small drain holes just below the level of the flat cover to prevent the liquid from overflowing the seal. It is not necessary to connect the cover with the beaker. If the cover is flat, and the rim of the beaker reasonably true, the surface tension of the film of liquid at the joint prevents any appreciable leakage as there is very little pressure upon it. The tube *C* may be made from a broken outer jacket or from any tubing of suitable size. It is cut square at both ends and its length is readily adapted to that of any inner tube. If desired, the beaker may be replaced by a metal can or spun bulb provided with the arrangement for a water seal, and the cover could be manufactured from porcelain or glass instead of sheet copper.

W. E. HENDERSON.

OHIO STATE UNIVERSITY.

CORRECTION.

In the article by Bogert and Heidelberger in the February number of THIS JOURNAL, **34**, 183, there occurs a confusing error which should be corrected. On page 188, the concluding sentence of the second paragraph reads: "It seems odd that the phthalone should form a salt with phthalic and not with the strong mineral acids." This sentence should be eliminated, since the compound to which it refers, and with which the rest of the paragraph deals, is not a phthalate of the *phthalone* but of the *quinazolone*.

M. T. BOGERT, M. HEIDELBERGER.

NEW BOOKS.

Hilfsbuch für Nahrungsmittelchemiker. By A. BUJARD AND E. BAIER. Third Edition. 8vo. pp. xviii + 730. Price, 12 M.

The scope of the book is not confined, as the title would indicate, to the examination of foods. It also includes tobacco, water, air, soil,

tanning material, urin analysis, and fifty pages are devoted to bacteriology.

The first edition of the book was warmly welcomed. The literature relating to the examination of foods and especially food adulteration for the most part could only be consulted in the original articles in the journals. Few reference books handled the subject in anything like an adequate manner. The work of Bujard and Baier appearing at this time presented an exceptionally valuable compilation of the methods then available.

The present edition does not appear to represent the literature on that subject to-day as well as the first edition did at the time of its publication.

The book is of special value, however, as a work of reference in the subjects that are ordinarily handled in several volumes but does not go into the detail often necessary in the investigation of a particular class of foods. The methods do not always include the latest ones published which have been found valuable for the examination of the products under discussion. For instance, the Roese method is still described for the determination of fusel oil in distilled liquors. The necessity for the examination of added oil in paprika is not recognized. The refractometer method for the detection and determination of methyl alcohol is not given. Sjerning's method for the separation of peptones and meat bases is not given.

Unfortunately the authors do not appear to have consulted the literature in other languages than their own.

The recent contributions of American laboratories which have made possible the adequate inspection of the foods on the market in this country are entirely overlooked with the exception of brief references to a very few abstracts appearing in German journals. Notwithstanding the enormous importance of German writers to the literature of food chemistry it is no longer possible for an author to treat the subject adequately and ignore the contributions of American laboratories.

W. D. BIGELOW.

L'Internationalisme Scientifique (Sciences Pures et Lettres). Par P. H. EIJKMAN. Médecin à La Haye. Publication du Bureau Préliminaire de la Fondation pour L'Internationalisme. La Haye. 1911. Price, three francs.

There are now so many international organizations, that, as Professor Schuster said five years ago, we must begin to guard against overlapping and future conflict. The Bureau Préliminaire de la Fondation pour L'Internationalisme has attempted to secure adequate information about every organization within certain limits which is fairly to be called international. This information is preserved in the "Archives et la Bibliotheque de l'Internationalisme." By means of a detailed and complete survey of international activities, it hopes to aid each new undertaking to avoid duplication and consequent division of forces.

In 1910, the Bureau published "L'Internationalisme Médical," giving information concerning more than two hundred enterprises connected with medical science. The present work contains a dozen pages of supplement to the publication of 1910, and then describes organizations having to do with Science and Letters, or with Science, or with Letters; letters is made to include linguistics and literature, and also history, art, philosophy and theology.

After 6 + xii + 108 pages of text, a larger number of unnumbered pages are filled with information concerning every international organization known to the Bureau, in a form available in making up card catalogs. EDWARD W. MORLEY.

Opere Scelte di Amedeo Avogadro. Publicate dalla R. Accademia delle Scienze di Torino. Torino: Unione Tipografico-Editrice Torinese. 1911. Quarto, pages 6 + cxl + 491. Price, 20 lire.

Count Amedeo Avogadro was for more than fifty years a member of the Royal Academy of Sciences at Turin, honored for distinguished attainments in science and loved as a man. When he passed away in 1856, the Academy provided a suitable commemorative discourse.

The year 1911 was the centennial of the publication of the first of the five great memoirs in which Avogadro's law was announced and supported and applied. Worthily to commemorate one of the most important achievements yet made in chemistry, the Academy in 1907 named an Executive Committee which has obtained a bronze bust of Avogadro and has provided for the publication of this selection from Avogadro's published memoirs.

The execution of the task is worthy of the Royal Academy and of the memory of Avogadro. The paper is of high quality; each page bears as a watermark the name *Amedeo Avogadro*; the type and presswork are excellent. It contains, first, a note by the president of the Academy; then, a portrait of Avogadro from the new bronze bust; a historical and critical discourse on the life and scientific work of Avogadro; reprints of his papers on the molecular constitution of gases, on electricity, on electrochemistry, and on capillarity; and a bibliography. Out of the 55 papers and books there listed as having been published, twelve are reprinted in full in this volume.

The Italian physicist Botto wrote an account of the life and scientific works of Avogadro soon after the death of the latter; there seems to have been no more extensive biography until Guareschi, in 1901, published his "Amedeo Avogadro e la teoria moleculare," in 47 quarto pages. Together with this memoir appeared a translation into Italian, by the daughter of Guareschi, of that paper of Avogadro which is most frequently cited, which had been published in 1811 in French, and which had never before been printed in Italian. It was natural that Guareschi

should be chosen to edit the present volume, and the choice was a happy one. The historical and critical discourse fills 140 pages. It is well written and clear. Some ten pages tell of Avogadro's life, about a hundred tell of the law named after Avogadro and of its applications, and some thirty pages describe Avogadro's other scientific work or contain documents concerning incidents in his life.

Avogadro's law is now regarded as the corner stone of the whole edifice of chemistry, and Avogadro's name is forever inscribed on it, alone. Only the older of chemists now living remember when it was called the law of Ampère and Avogadro. All of us have some knowledge of the fact that, although published in 1811, it was not generally accepted and generally regarded as important till forty or fifty years later, and that the experimental explanation of apparent exceptions, like that shown by ammonium chloride, needed even twenty years more. Nearly all of us know how the labors of Gerhardt and the voice of Cannizzaro were most influential in securing the general adoption of the law of Avogadro.

The fate of the law during the years before 1850 or 1860 makes a curious story. It was published by an Italian who was a French subject, in a French journal, before the great preeminence in chemistry had passed from France. But a rediscovery of the law by Ampère was published in the same journal within three years. During the next ten years, Avogadro had developed the consequences of his law in four following memoirs, and had arrived at formulas for many common or important compounds which agree with those adopted now. That these were not at once adopted by other chemists in place of those of Berzelius is not strange; but when Gerhardt, by the use of other methods, had come to similar formulas, and when physicists like Clausius had accepted the law, one could fairly presume that Avogadro would be honored for an important scientific service. Yet the Italian physicist who wrote in the *Nuovo Cimento* an account of the life and work of Avogadro at the time of his death did not mention the great law named after him. When in the next year a bust of Avogadro was unveiled at the University of Turin, no chemist spoke in his honor, and the physicist who spoke did not mention the law which is his chief title to remembrance.

After 1880, Avogadro's law was generally accepted, but often attributed to others. Wurtz, in 1864, named it the law of Ampère; in 1867, he expressly asserted "Ampère announced it first;" in 1868, he named it the law of Avogadro and Ampère; not till 1879, did he name it correctly. P. G. Tait, about 1870, attributed the law to Gay-Lussac. Some Italian chemists, between 1860 and 1875, attributed the law to Ampère or to Dumas.

The law was sometimes misstated, even by eminent chemists. Wurtz, in a lecture in 1863, spoke of the "celebrated assertion of Ampère and

Berzelius that equal volumes of gases contain equal numbers of *atoms*." When the law was rightly stated, its discovery was attributed to the study by Avogadro of the compressibility and expansion of gases, while the discoverer ascribed the discovery to the study of Gay-Lussac's observations on combining volumes. Some eminent American chemists have fallen into this error. It is true that Dumas, in the well known passage where he expounds the law, mentions compression and expansion, but he has in mind logical relations and not a history of origin.

The long neglect of the law and of its discoverer, and the subsequent mistakes as to its nature or its discoverer, are the occasion of an important chapter in Guareschi's discourse, entitled "Avogadro forgotten." In this are discussed the reasons for such a state of things. One reason was, the general failure to distinguish between atoms and molecules. Another, the fact that Avogadro was not known as an experimental chemist. An important cause lay in the political conditions of Italy, a country which Lamartine called *the land of the dead*. Up to the year 1840, against the great names of chemists in France, England, Germany, and Sweden, Italy could set but two names, those of Berthollet and Avogadro—and one of these was drawn from Italy to Paris. The state of the science also delayed the appreciation of the law; both Berthollet and Avogadro opened paths from which chemists were for a time diverted by matters more urgent or more immediately profitable to the science.

The discussion of these reasons, as well as of six more following, make this chapter especially interesting. Other chapters of especial interest are those which show how clearly Avogadro conceived and explained the distinction between atoms and molecules, how well he understood that property of atoms which we now call equivalence or valence, and how exactly his system of molecular formulas agrees with that used by all of us to-day. The book ought by all means to be accessible at every center of chemical instruction. EDWARD W. MORLEY.

L'Annuaire du Bureau des Longitudes pour l'année 1912. 16mo., 750 pages. Price, post-paid 1 fr., 85 ($0.36). Paris: Gauthier-Villars.

The volume contains 324 pages of physical and chemical tables, certainly a great deal for the money. There are some glaring inaccuracies, and very few of the tables contain any data determined within the last ten years. They may be recommended as 'better than none at all,' to those who have not sufficient money to buy better ones. J. W. R.

Physico-Chemical Calculations. JOSEPH KNOX. Methuen & Co., London. pp. 186. Price, 2s. 6d.

This book is intended to supplement the text-books of physical chemistry for class use. It is based upon Abegg and Sackur's "Physikalisch-Chemische Rechenaufgaben" but in the process of translation has been

rearranged and much enlarged. Each chapter has a short introduction giving definitions and the more important laws of physical chemistry expressed in mathematical form but not derived. This is followed by a few numerical problems (74 altogether) solved in detail and a larger number of problems to be solved by the student (291), the answer being given in each case. The author states that most of the problems have been taken from the literature but references are not given. A knowledge of calculus is assumed but very few of the problems given require the use of calculus. The section on thermochemistry would be improved by the inclusion of problems involving the influence of temperature on the heat of reaction as a function of the heat capacities of the factors and products. The van't Hoff equation $d\ln K/dT = Q/RT^2$ is integrated only on the assumption that Q is independent of the temperature. The resulting equation is used over a temperature range of 400° in one case. Similarly the only form of the free energy equation given involves the assumption that Q is independent of temperature. The section of the book dealing with the solubility product should be used with caution and rewritten in later editions in the light of very recent work (Noyes, Bray, Harkins, *et. al.*, THIS JOURNAL, Nov. and Dec., 1911). The book will undoubtedly increase the amount of problem solving done by students in courses in physical chemistry and therefore serve a valuable purpose.

GRINNELL JONES.

Magnetochemie: Beziehungen zwischen magnetischen Eigenschaften und chemischer Natur. PROF. DR. E. WEDEKIND. 110 pp. Mit 25 Text-abbildungen. Berlin: Gebrüder Bornträger. 1911. Price, 4 Marks.

The author has rendered a real service to those interested in magnetism, whether as physicists or chemists, in that he has collected and coördinated a mass of widely scattered and frequently conflicting observations. These he has systematized and arranged under the heads of ferromagnetic, paramagnetic and diamagnetic materials. He discusses the relation of the magnetic properties of the elements to their atomic weights and shows them to be a periodic function of the latter.

The magnetic properties of the alloys of nonmagnetic elements, the magnetic properties of compounds both inorganic and organic, and the influence of both high and low temperatures are discussed.

There are also presented an introductory chapter defining magnetic magnitudes and a brief description of methods of investigation and a closing chapter on the "Magnetonen" theory of Weiss. Unfortunately, from the viewpoint of the writer, the author does not introduce a chapter on the chemical effects of magnetism, references to which are so widely scattered through both physical and chemical literature. A collection of these observations would make very interesting reading.

The author appends a foot-note to his preface in which he asserts that

he has thoroughly reviewed the literature up to October 15, 1911. While the text is filled with references to original literature not one is to an American contribution. While the writer is not in a position to discuss the merits of the case he has in his possession a list of some forty-five contributions in American journals some of which are of indubitable value. We fear the oversight is simply another evidence of continental provincialism. H. G. BYERS.

Analytical Chemistry. Volume II, Quantitative Analysis. By F. P. TREADWELL. Third English Edition. Translated by William T. Hall. pp. xi + 903, 126 figures. 1911. New York: John Wiley & Sons. Price, $4.00.

The revised and enlarged edition of Professor Treadwell's admirable book will certainly receive a hearty welcome from all chemists. In the effort to prepare "a book which will be useful to English-speaking students" Professor Hall has done more than simply translate the German edition.

The printing of the text is uniformly well done, but the same cannot be said of all the illustrations. Only a few typographical errors have escaped the proof-reader, but the form "different * * * * * than" used twice on page 538 cannot be commended.

The book is differentiated from similar books by the unusual amount of detail regarding electrolytic methods of analysis and especially by the full treatment of gas analysis.

Among the later developments in analytical chemistry there is noted the determination of nitric acid as nitron nitrate, of nickel as nickel glyoxime and the use of the electric furnace for ignition of crucible contents. A colored chart of arsenic standards accompanies the description of Sanger's method for determining arsenic.

Physico-chemical considerations are noted in the discussions of the solubility product and the distribution coefficient. CHAS. H. HERTY.

Theorie und Praxis der Maassanalyse. von ALEXANDER CLASSEN. Leipzig. 1912. pp. 772. Akademische Verlagsgesellschaft, M. b. H.

With the object of embodying the theory of a science and its practical application in one production, Professor Classen has conceived and executed a masterly piece of work. The book is, however, more than its title claims it to be. Not only are the theoretical principles underlying every method illustrated by equations and explained by discussions, but the history of some of the older methods is also given and the merits of the various modifications they underwent critically and thoroughly discussed. The various theories advanced towards the explanation of the role played by catalyzers, as for instance manganese sulfate in the titration of iron with permanganate in the presence of hydrochloric acid, are quoted and the evidence for and against them weighed. As an ex-

ample of the fulness of the treatment, Volhard's method for the estimation of manganese occupies twenty-seven pages, the determination of silver twenty-two and that of zinc eighteen.

A point of special merit in this book is that the reason for every step in an analysis is given. The analyst is thus enabled to understand what he is doing and why.

The subject of standardization of solutions receives considerable attention, and much stress is laid on the choosing of the "primary substance (Ursubstanz) with which solutions are to be standardized."

The book is divided into five chapters: introductory, alkalimetry and acidimetry, oxidimetry, iodometry and precipitation analysis. The introductory chapter extends over one hundred and seven pages and deals with the principles of volumetric analysis, theory and descriptions of indicators and the calibration of volumetric apparatus. The Köttstorfer saponification and Reichert-Meisel numbers determination is found in the chapter on alkalimetry and acidimetry, the iodine number of oils and fats under iodometry and hardness of water and the estimation of reducing sugars are included in precipitation analysis.

While methods for the estimation of some of the rarer elements and substances, such as cerium, thallium, selenous and tellurous acids, are incorporated in this book, none are given for the technically important metals, lead and arsenic. Of the several excellent methods for the volumetric determination of manganese, only Volhard's is considered, the others are not even mentioned.

By reason of the method of treatment of the subject, the reading of this book, aside from being profitable, is, unlike that of most text-books, very enjoyable. We are sure that the volume will be welcomed by the student of chemistry as well as by the practical chemist. J. ROSIN.

The Identification of Organic Compounds. By G. B. NEAVE, M.A., D.S.C., and I. M. HEILBRON, Ph.D., Lecturers and Demonstrators, Department of Chemistry, Glasgow and West of Scotland Technical College. 103 + viii pp. New York: D. Van Nostrand Company. Price, $1.25.

The authors have attempted in this volume to bring together in a convenient form the principal reactions and physical constants of the most important organic substances, in such a way that by the use of it the identification of simple organic compounds may be easily accomplished. It is presumed that students in a course on the identification of organic substances are already somewhat experienced in organic chemistry.

The book is divided into thirty-four "sections." The first gives certain preliminary tests, the second the tests for the elements, the third takes up various "group reactions," such as the test for an aldehyde, amino group, etc., then follow sections on hydrocarbons, alcohols, ethers, and so on, the most important organic groups each occupying a

section. In each section are included the general properties and principal reactions of the group under consideration, together with a list of the more important members. For example, Section XXI deals with amines. The general properties are given, then the action of nitrous acid. A list of twelve aliphatic amines follows, but merely the formulas and melting points or boiling points are appended. Next, aromatic amines are considered, the tests explained, and a list of seventeen members briefly described. Finally eight halogen amines (such as *o*-chloraniline) are mentioned, the melting point of the amine itself and of its acetyl compound being given in each case. This section is fairly representative.

Some students may find this book useful, but the reviewer is of the opinion that the identification of organic substances is not a simple enough affair to permit of adequate treatment in a book of this size.

LATHAM CLARKE.

A Text-Book of Physiological Chemistry. By OLOF HAMMARSTEN. Authorized Translation from the Author's Enlarged and Revised Seventh German Edition. By JOHN A. MANDEL. Sixth Edition. New York: John Wiley & Sons. Price, $4.00 net.

This standard book has been enlarged and changed rather more than in previous editions. A new chapter from the pen of S. G. Hedin on Physical Chemistry in Biology has been added, dealing with osmotic pressure, colloids, catalysis, enzymes, ions and salt action. Its introduction has necessitated extensive rearrangements. The chapter on the Animal Cell of the previous edition has been eliminated while its subject matter has been distributed. Thus the nucleic acids, the purine and pyrimidine bases are treated with the nucleoproteins, and the lipoids with the fats. The result is not merely to systematize the material but vastly to increase the readability. Many of the chapters have been extensively rewritten so that very little important new work remains unconsidered. This is particularly noticeable in the treatment of proteins and of absorption. Not merely have well established new facts been incorporated but often hypotheses still under discussion have been treated in an objective and judicial way that is most illuminating. Some subjects, however, are declared not yet ripe for discussion. This is a matter for regret since the author has the gift of clarifying such subjects by impartial discussion. As the result of the present great activity in biochemistry the volume has again grown in size by more than one hundred pages, and has thus developed into a book of the greatest usefulness to the advanced student although it has, perhaps, become too large and detailed to serve as an introduction to the subject.

CARL L. ALSBERG.