

deals briefly with the formation, nature, and properties of these short-lived bodies. The volume itself gives a full account of the occurrence and chemistry of uranium, the treatment following lines familiar to those who know the *Handbuch*, in which probably the most characteristic feature is the abundance and diversity of the physical data provided. The references include literature up to the end of 1935 and appear to cover all the recent work on the element and its compounds.

P. L. R.

ALUMINIUMLEGIERUNGEN: PATENTSAMMLUNG. By A. Grützner and G. Apel. Part I. With supplement. Aluminium—Part A in Gmelin's *Handbuch der anorganischen Chemie*. Edited by the German Chemical Society. Pp. 342. Berlin: Verlag Chemie, 1936. 26.25 rm.

One of the most striking features in metallurgy, during the half century which has just elapsed, has been the movement of aluminium from the position of a metallic rarity to that of an exceedingly common industrial material. Its use has extended continuously from the days when it was obtained by a sodium reduction but the progress of its commercialization has been enormously accelerated by the employment of electrolytic methods of extraction. The popularity of aluminium is based on its low density and its stability in air. Both of these factors appear in some degree in its alloys, of which the volume under notice gives a list of more than four thousand. These range from binary alloys to those with seven foreign constituents. The data are tabulated, as in previous *patentsammlung* in this series, in three columns which set down the composition, indicate the properties, and give the appropriate reference.

P. L. R.

ALUMINIUMLEGIERUNGEN. PATENTSAMMLUNG. By A. Grützner, in collaboration with G. Apel. Part II. Including a *Markenverzeichnis Bekannter Aluminiumlegierungen*. By Dr. A. Von Zeeleder. With Supplement on Aluminium, Part A, in Gmelin's *Handbuch der Anorganischen Chemie*. Edited by the German Chemical Society. Pp. 344—868. Berlin: Verlag Chemie, G.m.b.H., 1936. 40.50 rm.

This is the second part of the *Patentsammlung* already noticed in the above review. It contains over 500 pages and gives the alloys formed by the metals titanium to zirconium in a list which follows the alphabetical order of the names of the materials added to aluminium. A short appendix sets out alloys which possess a trade name together with their manufacturers or discoverers and their compositions.

P. L. R.

ORGANIC CHEMISTRY

LES SOLUTIONS CONCENTRÉES: THÉORIE ET APPLICATIONS AUX MÉLANGES BINAIRES DE COMPOSÉS ORGANIQUES. By Prof. J. Timmermans. Pp. vi + 646. Paris: Masson et Cie, 1936.

The theories of Dolezalek and of van der Waals have proved of considerable value in interpreting the physical characteristics of solutions yet they are not entirely satisfactory, from a quantitative point of view, when

applied to solutions which are in any degree removed from the ideal state. As the volume of data now available is so great it is, perhaps, surprising that a more comprehensive and satisfactory knowledge of the laws governing liquid mixtures has not been forthcoming.

Possibly it is with the idea of throwing fresh light on these laws that Prof. Timmermans has produced this excellent exposition on concentrated solutions. As the title indicates the work is confined to binary mixtures of organic compounds and in concentrations (10% to 90%) in which it is not feasible to assign to any one component the rôle of solvent. Even so the information available is of considerable proportions and its collection and arrangement must have been no mean task. The classification adopted is one of decreasing chemical similarity between the components with a corresponding increase in the divergence of the solutions from ideality. Thus the opening chapter deals with optical isomers which being chemically and thermodynamically identical give mixtures obeying the simple additive rule. Then follow systems of other isomers which are classified according to the suggestions of Lowry and Steele (J.C.S., 1915, 1382) into static and dynamic isomers and tautomers. With few exceptions these form ideal solutions as also do mixtures of those substances which are sufficiently closely allied to exhibit isomorphism. The final chapter of this section deals with mixtures of homologues and of compounds which belong to the same type such as benzene, diphenyl, and naphthalene.

In the second section the dissimilarity of the constituents becomes more marked and deviations from the ideal are manifested by the appearance of azotropism, partial miscibility, or even of additive compounds. The mixtures systematized here are obtained by taking any two of the following: hydrocarbons, chloro-derivatives, oxygen compounds (other than those containing hydroxyl), nitrogen compounds, carbon dioxide, and carbon disulphide. Among other matters, this section contains an account of the author's interesting work on the influence of pressure on critical solution temperatures.

The last section of the book deals with systems in which one of the constituents contains the hydroxyl radical. Such substances show a more or less high degree of polymerization which is reflected in the pronounced abnormalities of the solutions. An extensive bibliography, tables of formulae, and complete indexes serve to round off a fine production.

The work is well written and never ceases to be interesting and readable. Each chapter is prefaced by a discussion of some theoretical topic most suitable to the system under review while the actual descriptive part is followed by a comprehensive list of mixtures about which data are available much of this being illustrated graphically. Although not entirely free from errors, those that occur are mainly trivial: one or two, however, are unfortunate. Thus on pp. 110 and 111 there is a table for converting concentrations in grams % into mols. % which is not easy to grasp at a mere glance; it is therefore illustrated by an example but as the latter omits to make any use of the table and as, moreover, its answer is incorrect, it offers but little help.

These are, however, minor blemishes on an excellent book which must prove of inestimable value to any who are interested in this domain of science. G. R. D.

ORGANIC SYNTHESSES: AN ANNUAL PUBLICATION OF SATISFACTORY METHODS FOR THE PREPARATION OF ORGANIC CHEMICALS. Editor-in-Chief, J. R. Johnson. Vol. XVI. Pp. v. + 104. New York: J. Wiley & Sons, Inc.; London: Chapman & Hall, Ltd., 1936. 8s. 6d.

The editorial board responsible for this publication has again succeeded in presenting methods for the preparation of a fairly wide variety of compounds, and so long as this policy is pursued so long will this series of volumes continue to find favour among the rank and file of organic chemists. In the present volume authoritative methods are provided for the synthesis of the following 28 compounds: β -Alanine, 4-aminoveratrole, *n*-butyl nitrite, *n*-butyl phosphate, coupling of *o*-tolidine and Chicago acid, *sym*-dimethylhydrazine dihydrochloride, *unsym*-dimethylhydrazine hydrochloride, 2,5-dimethylpyrrole, 1,4-diphenylbutadiene, epichlorohydrin and epibromohydrin, ethyl phenylmalonate, ethyl *n*-tridecylate, *n*-heptioic acid, *n*-hexaldehyde, isonitrosopropiophenone, methylbenzyl ketone, methylhydrazinesulphate, *p*-nitrobenzyl bromide, 4-nitrophthalic acid, 4-nitrophthalimide, pelargonic acid, phenanthrene-2- and 3-sulphonates, phthalaldehyde acid, phthalide, quinone, succinimide, tetrahydrofuran, and *sym*-trithiane. The volume concludes with an appendix of later references to preparations dealt with in preceding volumes, also additions and corrections for preceding volumes, together with a combined subject index to vols. X—XVI inclusive.

REACTIONS OF ORGANIC COMPOUNDS. By W. J. Hickinbottom, D.Sc. Pp. x + 449. London; New York: Toronto: Longmans, Green & Co., 1936. 16s.

This book is noteworthy in several respects, but primarily because it depicts the close relationship that exists between theory and practice. It is at once a textbook and a laboratory manual for students of organic chemistry, a source of inspiration to those who are about to embark on a course of organic research, and a book of reference which will be appreciated generally. Dr. Hickinbottom has certainly viewed the subject from a somewhat novel standpoint, but his survey is so pleasing and valuable that it will appeal to teachers and students alike. Essentially, the book is an account of the reactions of the commoner groups, and it deals with hydrocarbons, hydroxy-compounds, thiol compounds, ethers and thioethers, aldehydes and ketones, carboxylic acids and their derivatives, amines, nitro- and nitroso-compounds, azo- and diazo-compounds, halogen compounds, sulphonic and sulphinic acids, sulphones, and sulphoxides, and, quite logically, concludes with a section on the identification of organic substances. The treatment is fairly generous, and the value of the book is enhanced by numerous references to the appropriate literature and by 24 tables of physical constants and other data. The book carries a good subject index but no author index—a small deficiency which Dr. Hickinbottom will perhaps make good in the second edition which doubtless will be called for at an early date.

W. H. B.

TRAITÉ DE CHIMIE ORGANIQUE. By V. Grignard and P. Baud. Vol. II. Part I. Pp. xv + 593. Part II. Pp. 594—1273. Paris: Masson et Cie., 1936. Paper 240 fr.; bound 280 fr., the two parts.

The second volume of this work might have been published as a series of monographs, which would then have been classified as "Physical Chemistry." Their inclusion in the *Traité* indicates the sound principles upon which the authors have based their conception of what a treatise on modern organic chemistry should be.

Part I.—Molecular refractive power is dismissed very briefly, but optical rotation is dealt with very satisfactorily. Kuhn's theory is given prominence and its consequences discussed. Magnetic rotation is allotted short, but probably adequate, consideration. Absorption spectra and their application to the investigation of molecular structure are dealt with systematically, and the text is greatly helped by the inclusion of a large number of representative curves. Infra-red absorption spectra are next dealt with. Experimental methods are clearly described, and again the results are excellently discussed with the aid of numerous curves, use of which is rendered easy by the provision of a separate index of compounds mentioned. Fluorescence spectra are treated similarly.

About 80 pages are next devoted to X-ray analysis. Electron diffraction is included in this section, and might have been given much fuller treatment. Perhaps the same might be said of the section on X-ray analysis of aromatic compounds, although most of the basic facts are well set out, and one again has to remind oneself that it is a book on organic chemistry one is reading and not an attempt at an exhaustive physical monograph. The diffraction of X-rays by liquids is considered.

The chapter on the Raman effect is not unduly drawn out and gives the main features clearly. That on dielectric properties provides the reader with a lucid account of the essentials. The reviewer looked in the index for the names of two English workers, but failed to find them. This showed that the Authors' Index is incomplete, for one of the names was mentioned in the text. On the other hand, right through the book one does know where one stands, for at the end of each sectional list of references a statement is made as to the date to which they are taken. This particular section goes only to July 1, 1934, so that necessarily a good deal of recent work is excluded.

Magnetic properties are dealt with by the veteran worker in this field, Pascal, and is a thorough-going introduction to the subject. The same author contributes the interesting concluding chapter, on the parachor.

Part II.—Odour and constitution are treated in an interesting manner, showing the effect of various groups and structures. In the section on taste and constitution, sixteen different tastes are named. Interesting facts can be found here, e.g., that mustard gas has a sweetish taste, that *o*-benzoylbenzoic acid has first a bitter and then a sweet taste, that *p*-toluoylbenzoic acid is sweet and that *o*-3:4-dimethylbenzoylbenzoic acid is at first very bitter and then very sweet. Under "colour and constitution" one finds a very complete review of the various chromophores and