REVIEWS.

A DICTIONARY OF BRITISH SCIENTIFIC INSTRUMENTS.
Issued by the British Optical Instrument Manufacturers' Association. Pp. xii. + 335. (London: Constable and Co., Ltd. 1921.) Price 21s. net.

The reviewer is acquainted with no volume more unsatisfactory than the present one within the ambit of English scientific literature. He is heartily in agreement with those responsible for the issue of the volume in their belief that "a concise definition of each instrument, together with illustrations of the most important types, will be of real service to scientific men and the industry." How far does the volume go in the direction of providing such real service?

The book can be roughly divided into three sections. Opening with an altogether extraneous general view from above the National Physical Laboratory, and three illustrations of operations carried out thereat, perfectly unintelligible in the absence of any accompanying letterpress, the remainder of this section is devoted to short descriptions of "The British Optical Instrument Company," "Navigating Instruments," "The Royal Meteorological Society," "British Optical Glass," and "The Royal Observatory, Greenwich." The various matters are to a large extent treated historically, and some at least do not appear to have been written specifically for the present volume. That on "British Optical Glass" is, in the writer's opinion, the worst. Such common-place terms as "dispersive power" are wrongly defined, and an altogether wrong idea is conveyed of the production of achromatic images (p. 22). On pp. 28, 29 reference is made to three illustrations which are not given—an inversion of the practice already referred to.

The second section may be regarded as the dictionary proper. Its value can be judged from a consideration of a few examples of instruments upon which information was sought, *et hoc genus omne*. Some instruments, such as "astronomical clock" and "Cambridge flow recorder," are entirely undefined. Sometimes, when given, the definitions are of equal value. Thus:—"Bone and Wheeler's gas analysis apparatus" is "defined" as "for gas analysis purposes," "arsenic apparatus" as "used in the preparation and testing of arsenic," and an "autoclave" as "a vessel under steam pressure, for sterilising and other purposes; with a gauge for recording atmospheric pressure and temperature." Under "laboratory fittings" and "laboratory glassware" we find the "definition" "British make." Another very common type of definition is what may be called the "cross-reference definition." Thus, looking up "C.S.I. air-speed indicator," we find "A speed instrument for aeroplanes. See speedometer"; under "Speedometer" we read "See speed-recorder," and thereunder we find "an instrument for recording the speed of a motor car, etc." For a definition of the "Abbe Refractometer" we are referred to "refractometer," and we read, "Refractometer, Abbe, for liquids." Gas-works operations appear to be very restricted, as "Gas-works thermometers" are described as being of "two standard types, ranges 30°–160° F. and 70°–240° F. The attempt made to supply information as to where the various instruments may be obtained is frequently of little value.

The third section of the volume consists of illustrations of some of the various instruments "defined" in the second section. There is no accompanying letterpress. Most of the illustrations are taken from trade circulars, and many contain reference letters to the several parts (e.g., pp. 202, 203, 212, etc.). There are three illustrations of

a case of drawing instruments, and two full-page illustrations of spectacles and eye-glasses, the latter being referred to as of the folding pattern, of which pattern at least three pairs are not! The gold-leaf electroscope illustrated on p. 235 is shown tilted through a right-angle from its working position. The megaphone illustrated on p. 269 is probably the *chef-d'œuvre* in this section.

To sum up, a dictionary of scientific instruments is eminently desirable, but it must be conceived on very much more generous and accurate lines than the present volume if it is to fulfil its function. British scientific instruments derive, as stated in the preface, from the labours of those mighty geniuses, "Newton, Brewster, Airey, Dollond, Rayleigh, and Maxwell," that master of geometric design. There were others, and giants there are in the land to-day. Among the members of the Association responsible for the present volume we note some, at least, whose scientific instruments stand first amongst the similar products of the world. Let them ensure that their literary output is of a similar high standard, and not unworthy of their products and the high traditions of the British Scientific Instrument Industry.

J. S. G. THOMAS.

APPLIED COLLOID CHEMISTRY: GENERAL THEORY.
By WILDER D. BANCROFT. International Chemical Series, edited by H. P. TALBOT. Pp. viii. + 345. (New York and London: McGraw-Hill Book Co., Inc. 1921.) Price 18s. net.

This is a very interesting book and one which will be very valuable to practical chemists. It is packed with information, and the author's liking for facts and concrete realities is everywhere apparent. He makes a very sparing use of mathematical formulæ and discussions, and is not anxious to enter on any elaborate theorising or great generality of theoretical treatment. Nevertheless, most of the important points of theory are dealt with. The scope of the book will be evident from the following list of chapter headings:—I. Adsorption of Gas or Vapour by Solid. II. Adsorption of Vapour by Liquid, and of Liquid and Solid by Solid and Liquid. III. Adsorption from Solution. IV. Surface Tension—Brownian Movements. V. Coalescence. VI. Preparation of Colloidal Solutions. VII. Properties of Colloidal Solutions. VIII. Jellies and Gelatinous Precipitates. IX. Emulsions and Foams. X. Non-aqueous Colloidal Solutions. XI. Fog and Smoke. XII. Gases and Solids in Solids. XIII. Thickness of Surface Films. As will be seen from this list, many important matters are dealt with which have not hitherto been included in works on colloid chemistry. This is particularly evident in Chapters II., V., IX., and XI.

The book is very suggestive, as the author does not hesitate to state where reputed facts or explanations are doubtful or conflicting. The author's wide reading and knowledge make the book remarkable in the surprisingly wide range of subjects discussed. But the book is no mere compilation, as those readers will know who are familiar with the numerous researches on emulsions, colloids, adsorption, etc. which have appeared from Prof. Bancroft's laboratory at Cornell University. It can be warmly recommended to all those who desire a compact and concisely written account of the main facts and results of colloid chemistry. In characteristic fashion, the author gives in the Introduction a list of those who ought to study this subject. The passage is worth reproducing:—

"At first sight colloid chemistry may not seem to be an important branch of chemistry, either theoretically or technically; but this opinion changes when we consider that a knowledge of colloid chemistry is essential to anybody who really

wishes to understand about: cement, bricks, pottery, porcelain, glass, enamels; oils, greases, soaps, candles; glue, starch, and adhesives; paints, varnishes, lacquers; rubber, celluloid, and other plastics; leather, paper, textiles; filaments, casts, pencils, and crayons; inks; roads, foundry cores, coke, asphalt; graphites, patines; zinc, phosphorus, sodium, and aluminium; contact sulphuric acid, hardened oils, etc.; beer, ale, and wine; cream, butter, cheese, and casein products; cooking, washing, dyeing, printing; ore flotation, water purification, sewage disposal; smoke prevention; photography; wireless telegraphy; illuminants; comets; pharmacy; physiology. In other words, colloid chemistry is the chemistry of everyday life."

F. G. DONNAN.

A TEXT BOOK OF INORGANIC CHEMISTRY. VOL. IX., PT. II. IRON AND ITS COMPOUNDS. By J. NEWTON FRIEND. Pp. xxv.+265. (London: Charles Griffin and Co., Ltd. 1921.) Price 18s. net.

This volume is a further instalment in the series edited by Dr. J. Newton Friend, and it is written by Dr. Friend himself. In style it is similar to the volumes already published; it is well and clearly printed, and deals with the subject adequately. The references to literature are copious and well selected, and the book should enhance Dr. Friend's reputation and prove of value to all who are interested in the chemistry of iron.

The work as a whole is so well done that little detailed criticism is necessary, but a few minor points may be noted. Stannous chloride is twice recommended for reducing ferric salts before volumetric determination, but no mention is made of the necessity for removing excess of the reagent before titration. Calcium ferrite is described, and the only reference given to its production in the dry way is to two American chemists who published their work in 1916. Dr. Percy should receive credit as the first observer, some sixty years ago, and the work of Pelouze, by precipitation, might have been mentioned. In view of the industrial importance of iron-oxide basic slags, reference should have been made to recent determinations of the eutectic point and other properties of the series. The brittleness due to exposure of iron or steel to acid attack is stated to have been first observed by Johnson in 1873, but here again it seems that work by Dr. Percy may have been overlooked. Roberts is credited with observing in 1881 that the surface colours produced on steel when heated in air are due to the formation of oxide; but Sir H. Davy had proved the same fact more than half a century earlier.

The main criticism is one which may not appeal to all readers of these volumes. Dr. Friend adopts as his method of classification the Periodic Table. The result is that from a practical, and particularly from a metallurgical standpoint, the elements sometimes find themselves in strange company. Thus in Group 2 are included sodium, potassium, hydrogen, copper, silver, and gold; the properties and reactions of these elements are so diverse that it is probable that an equally good classification would be obtained by placing the symbols in a hat and drawing at random. In carrying out this classification in the volume, the headline over 60 pages in Chapter VII. is "Iron and the Elements of Group VI." Included are oxides, hydroxides, sulphides, sulphates, alums, selenides, etc., any of which would be more readily found under a suitable headline. Then, on the last page of this same chapter, and under the same headline, "iron and chromium" seems to slip in, as it were from nowhere, and iron and molybdenum, and iron and tungsten, are omitted altogether. One doubts

whether the ordinary reader would consider it an advantage to find, say, ferrous ammonium sulphate and chrome iron ore included under the same general headline. This criticism is aimed at the general plan of classification adopted in the book, which the reviewer well knows is one which has been largely favoured by modern teachers of chemistry. Those who prefer this classification will find little fault with the volume, for it represents much careful and discriminating work, and consequently will be helpful to teachers, students, and practical men.

THOMAS TURNER.

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HANDBOOK OF CHEMISTRY AND PHYSICS. By C. D. HODGMAN, assisted by M. F. COOLBAUGH and C. E. SENSEMAN. Pp. 711. (London: Chapman and Hall, Ltd. 1921.) Price 24s.

SOIL CONDITIONS AND PLANT GROWTH. By E. J. RUSSELL. *The Rothamsted Monographs on Industrial Science*. Pp. 406. (London: Longmans, Green and Co. 1921.) Price 16s.

BLEACHING. By S. H. HIGGINS. *Publications of the University of Manchester. Economic Series. No. XVI.* Pp. 137. (Manchester: University Press; London: Longmans, Green and Co. 1921.) Price 10s. 6d.

THE CARBONISATION OF PEAT IN VERTICAL GAS RETORTS. *Technical Paper No. 4. Fuel Research Board, Department of Scientific and Industrial Research*. Pp. 16. (London: H.M. Stationery Office. 1921.) Price 6d.

KAUTSCHUK UND FLECHTENSTOFFE. By E. FON-ROBERT, C. HARRIES, V. GRAVE, and W. BRIEGER. *Handbuch der Biologischen Arbeitsmethoden herausgegeben von Prof. E. ABDELHALDEN. Abt. 1, Chemische Methoden, Teil 10, Heft 1.* Pp. 438. (Berlin: Urban and Schwarzenberg. 1921.) Price 120 mk.

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NOTES ON INORGANIC CHEMISTRY. By F. FRANCIS. Pp. 244. (Bristol: J. W. Arrowsmith, Ltd. 1921.) Price 8s. 6d.

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THE RIDDLE OF THE RHINE: CHEMICAL STRATEGY IN PEACE AND WAR. By V. LEFEBURE, with an introduction by FIELD-MARSHAL SIR H. WILSON. Pp. 277. (London: W. Collins Sons and Co., Ltd. 1921.) Price 10s. 6d.

MONOGRAPHS ON MINERAL RESOURCES, WITH SPECIAL REFERENCE TO THE BRITISH EMPIRE. *Imperial Institute.* (London: John Murray. 1921.):—SILVER ORES. By H. B. CROSSHAW. Pp. 152. Price. 6s.

PETROLEUM. Prepared jointly with H.M. PETROLEUM DEPARTMENT and with the co-operation of H. B. CROSSHAW. Pp. 110. Price 5s.

DIRECTORY OF CHEMICAL INDUSTRIES IN CANADA, DATED JANUARY 1, 1921. Pp. 109. *Dominion Bureau of Statistics.* Ottawa, 1921.