TRADE NOTES.

BRITISH.

Nigeria in 1917.—The total value of the exports from Nigeria in 1917, exclusive of specie, was £8,602,486, and was higher than in any previous year in the history of the colony. The exports included rubber (878,281 lb.), tin ore (9,966 tons), palm oil (74,619 tons), palm kernels (185,998 tons), and groundnuts (50,334 tons).

Sixty-six tin mining companies continued operations during the year, their nominal capital being £5,717,407 and their working capital £2,678,858. Gold mining operations were continued near Minna, in the Niger Province, and 2,865.7 oz. of gold, all alluvial, was won. The general development of the Udi Colliery has been very rapid, 83,405 tons of coal being mined.

The Director of Agriculture reported that great developments are possible in the cultivation of maize, cotton and groundnuts; maize and groundnut seed were distributed as an initial step towards the end of the year.

The season was a fair one for most crops except cotton, which was a serious failure. With the exception of groundnuts and palm produce, crops for export were restricted by the shortage of shipping facilities.

The rubber market was not active, but satisfactory prices were obtained. The methods of getting the rubber are wasteful, and the industry is barely profitable. Rubber tapping was again carried out at the Government agricultural stations at Calabar and Agege Para with a view to thinning out these plantations. The cultivation of the sugar cane makes progress on native plantations, approximately 150 acres being under cultivation.—(*Col. Rep.*—Ann., No. 1008, Nov., 1919.)

Ashanti in 1918.—Exports from Ashanti in 1918 were valued at £1,292,736 as compared with £1,378,708 in 1917, and included gold (£421,736), cocoa (£360,000), kola (£360,000), rubber (£36,000), and hides and skins (£20,000). Trade in general decreased owing to low prices occasioned by a lack of shipping facilities and by war restrictions. The price of rubber was disappointing, the market declining steadily throughout the year. The amount of gold produced during the year was 99,278.35 oz., valued at £421,736, as compared with 116,456.36 oz., valued at £494,706 14s., in 1917.—(*Col. Rep.*—Ann., No. 1012, Dec., 1919.)

FOREIGN.

Calcium Carbide Importation into China.—The Canadian Government Trade Commissioner at Shanghai states that the importation of calcium carbide into China is probably about 300 tons per annum, some 250 tons of this being imported by one firm for use in acetylene-gas welding. Scarcely any calcium carbide is used for lighting purposes in China.—(*Bull. Dept. Trade and Comm., Canada*, Dec. 29, 1919.)

Graphite Situation in Madagascar.—The demand for graphite has decreased considerably, and most of the small mines have been compelled to shut down. The larger undertakings are working on a reduced scale, and in order to meet present competition are producing higher grade material. The average grade produced in 1917 was 80–82 per cent. carbon; to-day considerable quantities of 90 per cent., and even higher, material are being marketed. It is estimated that the 1919 production will be about 6,000 tons, while a reliable authority places the total stocks in the country at 25,000 tons. The average price in July was 550 francs per metric ton for 90 per cent. quality. The prospects are not at all favourable, as the largest buyer of Madagascar flake has recently cancelled its contracts.—(*U.S. Com. Rep.*, Nov. 21, 1919.)

OBITUARY.

CHARLES EDWARD GROVES.

By the death of Mr. C. E. Groves this Society loses one of its original members. Groves was born at Highgate in 1841, and was educated at Brixton College and under Hofmann at the Royal College of Chemistry. For many years he was lecturer in Chemistry at Guy's Hospital, retiring in 1901. He took an active part in founding the Institute of Chemistry, was secretary thereof until 1892, and vice-president from 1892 to 1895. Twice he served on the council of the Chemical Society, once as vice-president, and was editor of the *Journal* from 1884 to 1899. He also edited Calvert's "Dyeing and Calico Printing," two volumes of *Chemical Technology*, two volumes of *Miller's Chemistry*, and two volumes of *Fresenius's Analysis*. In these capacities his knowledge of several languages stood him in good stead.

Most of his research work was carried out in conjunction with Dr. J. Stenhouse, and dealt with organic substances; naphthol, orcinol, gardenin, berberine, erythrin, rocellinin, and icacin all engaged his attention. He exhibited specimens of original substances at the Franco-British Exhibition in 1908. Chemists owe much to Groves for his introduction of what is now an indispensable article in every laboratory, the indiarubber cork; he also originated the glass Liebig condenser. He gained his F.R.S. in 1883, and was a regular attendant at the meetings as well as at those of other scientific societies. He was consulting chemist to the Thames Conservancy for over twenty years, retiring in 1909. For a few years longer he was able to maintain his interest in scientific work and progress, but failing health finally necessitated complete retirement, and he died on February 1, at his home at Kennington. Apart from his technical attainments, Mr. Groves was a man of marked literary ability and great personal charm.

HERBERT F. STEPHENSON.

With deep regret we record the death, on February 17, of Prof. J. Emerson Reynolds, who served as president of this Society in 1891–1892.

REVIEW.

IONS, ELECTRONS, AND IONISING RADIATIONS. By J. A. CROWTHER. Pp. vi.+276. (London: Edward Arnold. 1919.) Price 12s. 6d. net.

The older philosophy taught that an impassable gulf was fixed between the realm of physics and that of chemistry. A physical change was defined in the text-books of some twenty years ago as a change in which the molecule of the substances involved remained intact. In contradistinction, any change accompanied by the production of new atomic groupings was described as a chemical change. Modern philosophy teaches that physics and chemistry merge into one another, the gulf previously assumed to exist being bridged by the recognition of physical chemistry as a transition subject. The reviewer would go further and contend that chemistry and physics are one and indivisible. Physical chemistry is not a kind of "No man's land," but rather an "Everyman's land"—to chemist and physicist impartially. The work under review illustrates this contention. Physical chemistry, as taught to chemists, is generally regarded as possessing a chemical bias. Nevertheless, the transformations mainly considered in such treatment are such as involve no destruction of the molecule. The newer physical chemistry—that of the electron—would, we think, be regarded as

physical chemistry with a physical bias; but, curiously, it is concerned entirely with atomic and sub-atomic disintegrations.

The work under review is offered by the author as an attempt to supply the student entering upon the study of the "new Physics," with "the same help and guidance which is already provided for him in other branches of physics by numerous textbooks, elementary and advanced." The work is not intended to be either a "popular" exposition of the matter nor a compendious synopsis of the whole subject. The author's previous book, "Molecular Physics," and his distinguished contributions to the growth of the subject, afford sufficient guarantee of his ability to undertake the task. It can at once be said that the author has succeeded to a very considerable degree in presenting a concise and clear account of the diverse phenomena contained in the classic works on the subject. The text embraces sixteen chapters, and among the subjects treated are the phenomena attendant upon the passage of a current through an ionised gas, the characteristic properties of the gaseous ions, ionisation by collision, cathode, positive and X-rays, photo-electricity, radio-active changes, the electron theory of matter and allied subjects. The author starts out with the laudable intention of emphasising the underlying physical principles at the expense of mathematical treatment of the subject, wherever possible. In spite of this intention, the reviewer is left with the impression that the usefulness of the work would be very considerably extended if it were found possible to curtail further the mathematical treatment, additional experimental details being substituted therefor.

A careful perusal of the work tempts the writer to offer the following as amongst a number of minor points which should receive attention when the issue of a second edition of the work is being considered. It is incorrect to state, as on page 4, "the ions were thus rendered visible . . ." The reader is left with the impression that the ions themselves are made visible. On page 10, line 11, the current should be 3.3×10^{-12} ampères, and not 3.3×10^{-14} ampères as given. On the same page,

equation (1) should read $i = -\frac{dQ}{dt} = -C\frac{dv}{dt}$, the minus sign is of no little importance in another connexion. The introduction of λ on page 19 is a little obscuring, as subsequently in the paragraph it is not used. Incidentally, it may be remarked that this symbol λ is used in the work with the separate significance of mean free path, wave length and co-efficient of absorption—a literal Pooh Bah! There appears to be some confusion of the symbols v and v' in § 12. To speak of "complicated constants," as on page 22, tempts one to enquire what a constant really is. The reproductions of Wilson's photographs—Figs. 17 and 18—could be considerably improved. Occasional use is made of the expression "sign of the point" as on page 70, when what is meant is the sign of the charge on the point. Fig. 62 would be improved by drawing in the reflected wave front. It is distinctly misleading to speak, as on page 158, of the crystal diffraction structure as the exact analogue of the ordinary diffraction grating. The contrast between the two is clearly seen from the fact that no path difference is introduced in the case of regular reflection from the ordinary diffraction grating. Among a number of minor points, we consider that the numerous graphs illustrating the texts would be improved if the significance and the scales of ordinates and abscissae were inserted in every case. Reference might also be made to the various sources whence further details of the various researches might be derived. The concluding paragraph of the text leaves one with the impression that the development of the subject waits upon the further development of the quantum hypothesis before the prin-

ciples of the subject can be definitely laid down. In the reviewer's opinion this is not so. The fundamental principles can be, and indeed have been, stated in Schott's "Electromagnetic Radiation," without reference either to the quantum hypothesis or the now "popular" Postulate of Relativity. Parenthetically it may be remarked that it appears that a strict application of the Postulate of Relativity excludes the possibility of a mechanical explanation of the electron.

Wherein consists the importance of the subject to the industrial chemist? Principally, though not entirely, in the matter of future supplies of energy. However well the New York striker's reply to the query as to the strikers' requirements, "I don't know what we want, but we want it mighty bad and we want it mighty quick," may epitomise things generally at present, the immediate and insistent demands of industrial chemistry can be stated with no little precision. Chemical industry needs an abundant and consequently cheap supply of readily available energy. Atomic energy is certainly abundant. The total heat emitted from one gram of radium emanation (see page 249) is 2.4×10^9 calories. Contrast with this the 3.8×10^4 calories of heat liberated in the formation of one gram of water from its elements—the most energetic chemical reaction known. There are some—Sir Oliver Lodge is among the prophets—who visualise a not very distant future when atomic energy will be available for the everyday purposes of industry. Others regard the tapping of these almost inexhaustible supplies as about as probable as the importation of coal from the moon. The future holds the solution. It can only be said that progress is being made, and that possibly we are on the threshold of big discoveries. Chemical technologists need to be abreast of these possibilities, and the present work is heartily recommended to such as possess the necessary modicum of mathematical training. J. S. G. THOMAS.

PUBLICATIONS RECEIVED.

- CHEMISTRY FOR TEXTILE STUDENTS. By BARKER NORTH, assisted by NORMAN BLAND. Pp. 379. Cambridge Technical Series. (Cambridge: The University Press. 1920.) Price 30s.
- A TEXT-BOOK OF QUANTITATIVE ANALYSIS. By A. C. CUMMING and S. A. KAY. Third edition, revised and enlarged. Pp. 416. (London: Gurney and Jackson. 1920.) Price 12s. 6d.
- THE MINERALOGY OF THE RARE METALS. By E. CAHEN and W. O. WOOTTON. Second edition, revised by E. CAHEN. Pp. 246. (London: C. Griffin and Co. 1920.) Price 10s. 6d.
- PUBLICATIONS OF THE UNITED STATES BUREAU OF MINES. DEPARTMENT OF THE INTERIOR. (Washington: Government Printing Office. 1919.)
- BIOGRAPHY OF PETROLEUM AND ALLIED SUBSTANCES IN 1916. Bull. 165. By E. H. BURROUGHS.
- RECOVERY OF ZINC FROM LOW GRADE AND COMPLEX ORES. Bull. 168. By D. A. LYON and O. C. RALSTON.
- ILLINOIS MINING STATUTES ANNOTATED. Bull. 169. By J. W. THOMPSON.
- RECENT DEVELOPMENTS IN THE ABSORPTION PROCESS FOR RECOVERING GASOLINE FROM NATURAL GAS. Bull. 176. By W. D. DYKEMA.
- THE DECLINE AND ULTIMATE PRODUCT OF OIL WELLS; with Notes on the Valuation of Oil Properties. Bull. 177. By C. H. BEAL.
- PETROLEUM INVESTIGATIONS AND PRODUCTION OF HELIUM. By VAN H. MANNING.
- THE DETERMINATION OF COMBUSTIBLE MATTER IN SILICATE AND CARBONATE ROCKS. By A. G. FIELDNER, W. A. SELVIG and G. B. TAYLOR.