on a large extent are to be expected as soon as the Government restrictions are removed. The position for 1919, of course, underwent a complete change on the signing of the Armistice, and owing to the fact that most companies will only produce to half their capacity this year profits will be curtailed accordingly. On the other hand, all the synthetic nitrate works in Germany are reported to have closed down, and that country may therefore be expected to become a large buyer of Chilean nitrate for next spring, which requirement, together with an increasing demand in all other countries, is likely to absorb the available supplies. While, therefore, large profits for this year may not be obtained, the future outlook for the industry looks promising.—(*Fin. Times*, April 9, 1919.)

The Zinc Market in 1918.—In the annual review of the spelter market, issued by Messrs. Rudolf Wolff and Co., it is stated that the average official price of spelter during 1918 was £52 4s. per ton. Up to November 25 last, the official prices were £54 to £50 per ton, but, it is stated, these were fictitious, as consumers were asked to pay £57 per ton for ordinary quality, delivered at consumers' works, and £75 per ton for 99.9 per cent. guaranteed metal. According to the United States Geological Survey the production in that country in 1918 was 537,500 (short) tons, as compared with 695,735 tons in 1917. Japan produced about 43,800 tons in 1918, as against 42,000 tons in 1917. The Canadian production is estimated at 12,500 tons (14,000 tons in 1917), the British 33,000 tons, which is rather less than in 1917, the Australian 5892 tons, and the French from 10,000 to 20,000 tons. The above figures, which are not final, show a general tendency towards diminished production. The position in the United States is unique. When prices rose to over £100 per ton, many new works were started and paid for out of the huge profits made by the older works. As the price of production was taken at about £60 per ton, the owners of these new works closed them down directly the price fell below this figure. The value of spelter in that country is now about 6 cents per lb. (say £27 per short ton) and it appears probable that production will be further drastically curtailed.

As regards consumption in this country, the output of galvanised iron has been stifled, and there are arrears of about 2½ million tons, based on pre-war figures, to supply. This quantity is equivalent to about 200,000 tons of spelter—a normal year's output in the United Kingdom. There has been some disappointment about supplies of zinciferous materials, and our capacity for treating Australian concentrates is below what was expected.

German Zinc Statistics.—A recent issue of the *Deutsche Allgemeine Zeitung* gives the following approximate figures for the output and trade in zinc during 1918 (metric tons):—Production, 280,000; imported, 50,000; exported, 105,000; consumption, 231,000. A considerable proportion of the last-mentioned quantity was sent abroad in the shape of semi-manufactured and finished goods. In 1913, Germany smelted 260,000 tons of foreign zinc ores yielding 103,000 tons of zinc, and 541,000 tons of home ores yielding 175,000 tons of metal. The crude zinc output of the War Raw Material Section was 196,500 tons in 1916, 186,500 tons in 1917, and 198,000 tons in 1918 (up to October). These amounts fully covered war needs. At present the home zinc production exceeds the demand, and although the latter will increase after the signing of peace, there will be no necessity for some time to come to import either zinc ores or the finished material.—(*Ed. of Trade J.*, April 3, 1919.)

REVIEWS.

THE MANUFACTURE OF ALUMINIUM. By J. T. PATTISON. Pp. 104. (London: E. and F. Spon, Ltd. New York: Spon and Chamberlain. 1919.) Price 7s. 9d. net.

This is a very small book on a very large subject. Two-thirds of Mr. Pattison's space is devoted to the analytical methods used to control the processes by which aluminium is produced, the remaining 41 pages being divided into chapters describing the manufacture of electrodes and alumina, the history, occurrence and founding of aluminium; its alloys, uses and application.

In the analytical section the author is clearly most at home. The methods he describes are on the whole workable, though recent developments are excluded, while much space is devoted to sampling, standardisation of solutions, gas and coal analysis and descriptions of every-day apparatus. Curiously, in view of the title, no chapter deals with the actual electrolysis, although in the historical section several pages are devoted to showing how the electrical efficiency of the process may be calculated without, however, arriving at any result. The occurrence of aluminium is interestingly discussed, while the chapters dealing with the manufacture of electrodes and alumina, although not generally representative, give an adequate outline of their subjects as applied to one factory. The remaining three chapters must be regarded as totally inadequate.

The book contains some very surprising statements. Few soldiers will share the author's view that "aluminium would make splendid field guns," or metallurgists back his statement that "in most alloys of aluminium an intra-physical (*sic*) change takes place," or that the Schoop welding process depends for its success upon first plating the metal with copper. Nor does "amethyst" appear to be a promising source of aluminium. There is a table of physical and mechanical properties from which the reader may gather, *inter alia*, that "the tensile strength of aluminium is about 17 tons per sq. in.," while "the breaking load in lb. per square inch section = 28,200."

RICHARD SELIGMAN.

ORGANIC CHEMISTRY FOR ADVANCED STUDENTS. By JULIUS B. COHEN. In 3 Parts. Second Edition. Part I. Pp. viii + 366; Part II. Pp. vii + 435; Part III. Pp. vii + 378. (London: Edward Arnold, 1918.) Price 54s. net.

Whilst the plan and subject-matter of the more elementary text-books on organic chemistry present no great difficulties, the preparation of a handbook for those who have penetrated what Wöhler described as "the tropical forest primeval, full of the strangest growths," is a task requiring sound judgment and a first-hand knowledge of the requirements and aptitudes of advanced students. The objective may be approached either by a systematic extension of the fundamental data and principles following the sequence of the ordinary text-book, as in Victor Meyer's admirable "*Lehrbuch der Organischen Chemie*," or the systematic order may be abandoned in favour of summary accounts of selected portions of the subject-matter. There are complementary advantages in the two methods. The latter, which is that adopted by Prof. Cohen in the work under review, is in many respects the more stimulating as it brings the data and theoretical considerations drawn from a wide range of compounds under a common head, and thus permits of their discussion from a more general standpoint than would otherwise be possible. The reader is thus encouraged to build up and reconstruct his knowledge from within as well as from without, and provided the

reading is accompanied by careful thought, the result should prove in every way advantageous. This spirit of inquiry and introspection is fundamental for the application of the knowledge gained.

The new edition of Prof. Cohen's book is published in three parts, in place of the two volumes of the earlier issue, with the object of securing a more effective grouping of allied subjects and of linking them together, as far as possible, in a consecutive form. The three parts are entitled "Reactions," "Structure," and "Synthesis"; each part is provided with a separate index both of subjects and of authors.

Part I. commences with a concise historical introduction in which the rise and development of organic chemistry is sketched, and is followed by chapters on the Valency of Carbon, Nature of Organic Reactions, Dynamics of Organic Reactions, and Abnormal Reactions. In the first of these the tervalency of carbon as shown in the triphenylmethyl group and the evidence in favour of bivalent carbon in many cyanogen and allied compounds, together with modern theories of valency, are fully and fairly discussed, and although the space allotted to the subject might be regarded as somewhat too great, it is fully justified in view of the important part the element carbon has played in the development of both the earlier and modern views on valency. The subject serves as a good introduction to the succeeding chapter on the Nature of Organic Reactions in which additive reactions, conjugated double bonds, Thiele's theory and allied problems are first discussed. The concluding portion which deals with condensation reactions concerned with chain and ring formation is, however, unnecessarily long and detailed. It extends over 100 pages, and although most carefully dealt with, the examples selected are so numerous that they are likely to prove wearisome reading. Apart from the advanced student whose thoughts are too fully centred on the examination room, a more restricted choice should suffice to inculcate the main principles involved, and would give a happier stimulus to further inquiry for which references should suffice. The chapter on the Dynamics of Organic Reactions comprises a useful and well-selected choice of the applications of physical chemistry to organic problems. Reactions associated with steric hindrance form the subject-matter of the concluding chapter on Abnormal Reactions.

Part II., the volume on "Structure," deals entirely with theoretical considerations, and comprises Physical Properties in relation to Structure, Stereo-isomerism, Isomeric Change, and a full discussion of the elusive, time-honoured problem, the Benzene Theory. Each of these important subjects is described with exceptional clearness and lucidity; they are brought thoroughly up to date, and no bias towards any one view is apparent. This unbiassed attitude has its merits, but it would perhaps be more suggestive and stimulating to readers had the author drawn upon his store of ripe experience and knowledge to indulge in a somewhat fuller criticism of the subjects concerned; it would have added interest, for instance, to learn his views on asymmetric synthesis in relation to vitalism. The problems are, in the main, developed historically. Although this method of presentation has value, the present day view-point is enhanced, in many instances, by a less heuristic treatment; for example, the subject of tautomerism when developed from Lowry's theory of reversible isomeric change or dynamic isomerism gives excellent opportunity for placing all the phenomena concerned on a comprehensive and applicable basis.

The concluding volume, "Synthesis," gives a comprehensive and accurate account of the synthetic methods employed in the preparation

and study of the Carbohydrates, the Purine Group, Terpenes and Camphors and the Alkaloids, together with a chapter on Fermentation and Enzyme Action. The subject-matter selected is no doubt representative and instructive, and with obvious limits of space much material must necessarily be excluded. There are, however, other subjects which might perhaps do more than some of these classical examples to arouse the interest of students towards research, such as the natural synthesis of vital products, and the services of modern organic chemistry to allied sciences such as pharmaco-therapeutics; nor would it appear out of place were some of the modern developments of industrial organic chemistry outlined as a stimulus to the association of academic work with industrial progress, or some account included of the practical methods of organic chemistry and their limitations. Perhaps some of these suggestions or similar material may be incorporated in a future edition.

These few criticisms, however, stand apart from the outstanding value of the work as a whole which is written with the very greatest care and authority. This new edition will continue the good work of the previous issue in aiding the study of organic chemistry, and the author is to be congratulated on the admirable manner in which he has carried out his task and on the timely publication of the work. Every stimulus to the study of organic chemistry is more than welcome to-day; the country has an opportunity of redeeming the neglect of the past by the retention and development of the organic chemical industries. Their future is dependent on those whose knowledge of organic chemistry leads them from studentship to research, for in no branch of the science can it be more truly said that "pure scientific research, carried out in the laboratory, is the soul of industrial prosperity."

CHARLES A. KEANE.

PUBLICATIONS RECEIVED.

THE SPINNING AND TWISTING OF LONG VEGETABLE FIBRES (FLAX, HEMP, JUTE, TOW, AND RAMIE). By H. R. CARTER. *Second Edition, Revised and Enlarged.* Pp. 434. (London: C. Griffin and Co. 1919.) Price 24s.

THE PRINCIPLES OF BLEACHING AND FINISHING OF COTTON. By S. R. TROTSMAN and E. L. THORP. *Second Edition, Revised.* Pp. 347. (London: C. Griffin and Co. 1918.) Price 21s.

BULLETIN OF THE IMPERIAL INSTITUTE. Vol. XVI. No. 4. October-December, 1918. Pp. 605. (London: John Murray.) Price 2s. 6d.

THE CULTIVATION, COMPOSITION AND DISEASE OF THE POTATO. *Supplement to the Journal of the Board of Agriculture.* March, 1919. (No. 18.) (London: The Board of Agriculture and Fisheries. 1919.) Price 6d.

THE TRANSACTIONS OF THE CANADIAN MINING INSTITUTE, 1918. Edited by the Secretary. Vol. XXI. Pp. 444. (Montreal: 503, Drummond Building.)

PUBLICATIONS OF THE UNITED STATES GEOLOGICAL SURVEY. DEPARTMENT OF THE INTERIOR. (Washington: Government Printing Office. 1919.)

POTASH IN 1917. By H. S. GALE and W. B. HICKS.

COBALT, MOLYBDENUM, NICKEL, TITANIUM, TUNGSTEN, RADIUM, URANIUM, AND VANADIUM IN 1916. By F. H. HESS.

NATURAL-GAS GASOLINE IN 1917. By J. D. NORTHROP.