and cattle dips and other chemical products. A plant has recently been completed which is able to supply the whole of the Union's requirements in detonators, and the fertiliser plant is capable of producing 70,000 tons per annum. The issued share capital consists of 500,000 ordinary shares of £1 each, all of which are held by the De Beers Company, and the profits, before allowing for depreciation and taxation, have lately been at the rate of about £146,700 per annum, but the fertiliser plant has only recently come into operation.

NATIONAL DYES, LTD.—The first annual report and accounts covering the period December 15, 1919, to December 31, 1920, were presented to the shareholders on June 6. The report shows that 786,703 lb. of colours and 306,848 lb. of intermediates were manufactured at the company's works during that period, which is considered satisfactory, especially having regard to the fact that the trade depression necessitated the complete closing down of the factories before the end of the year. The accounts show a gross profit, after making suitable provision for decline in market value of certain raw materials, of £62,098, and after writing off £13,034 depreciation on plant, tools and machinery, £17,080 debenture and bank interest, also bad debts, etc., a balance of £6,610 is carried forward to the debit of profit and loss account.

THE BRITISH OIL AND CAKE MILLS, LTD.—Addressing the 23rd ordinary general meeting on May 31, Mr. J. W. Pearson, chairman, said that the coal strike had entailed no stoppage of the company's operations, as practically all the boiler plants had been converted to use oil fuel, approximately 75 per cent. of the entire output being obtained by this means; and that certain of the refinery refuse could be profitably burnt in the converted plant. Except at such expensive centres as London, he was doubtful of the superior economy of oil fuel; further north, where coal could be supplied at less than half the price in London, the advantage was entirely in favour of coal. The profit and loss account for the year 1920 shows a balance of £414,464, which with £22,010 brought in allows of a total dividend of 15 per cent. on the ordinary shares, compared with 25 per cent. for 1919, when the ordinary share capital was one-half of what it is now (£2,500,000). Stocks at the end of the year were exactly the same as at December 31, 1919, but the value was assessed at one-half.

BRITISH CELLULOSE AND CHEMICAL MANUFACTURING CO., LTD.—A progress report states that the board has adopted the recommendations made by Mr. A. Chamberlain (a director) in December last which proposed an immediate and drastic restriction of programme, including the cancellation or postponement of the delivery of much plant. The present position is that plant to produce 1 ton of silk per day is nearing completion; the daily output is about 1000 lb., and it is expected to increase this to 1 ton by the end of August. To make provision for an output greater than 1 ton per day, the sum of £278,000 has been borrowed and secured by a debenture. Any further increase in output capacity will require further cash. The directors are quite satisfied with the quality of the silk, which dyes well and gives results in many respects superior to those obtained with other artificial silks. The Post Office has approved the use of the silk for insulating purposes. Owing to the importations of carbide and other chemicals from the Continent, the carbide and other chemical departments were closed down early in the year, but it is hoped to reopen them if the Safeguarding of Industries Bill becomes law and these branches of the company's work are included within its scope. The production of non-inflammable celluloid is making good progress.

REVIEWS.

- (1) **ECONOMIC MINERALOGY.** By THOMAS CROOK. Pp. xi+492. (London: Longmans, Green and Co. 1921.) Price 25s. net.
- (2) **GEOLOGY OF THE NON-METALLIC MINERAL DEPOSITS OTHER THAN SILICATES. VOL. I. PRINCIPLES OF SALT DEPOSITION.** By A. W. GRABAU. Pp. xvi+435. (New York and London: McGraw-Hill Book Co., Inc. 1920.) Price 30s. net.

No single treatise can essay to cope with the facts and principles of so complex a subject as economic mineralogy or geology in a manner that will satisfy the needs of specialists; they have to turn to the books dealing with their specific subjects, it may be gold, zinc, oil, clay, and so on. The student who requires something more than a catalogue and less than a monograph is fairly well provided for by Delaunay, Stutzer, Dammer and Tietze, Krusch and Beyschlag, and a goodly array of works on the genesis and distribution of ore minerals. But, judging by the recent output of such books, there is evidently a demand for a condensed practical guide to the study of useful minerals, and no book yet published in English has more successfully achieved this object or contains more information for its size than does Mr. Crook's mineralogy. Nothing, however, could illustrate more clearly than the two books under review the wide divergence that is possible in the treatment of the subject; the first is in effect a compact encyclopedia, the second is an attempt to treat one broad aspect of the subject philosophically, but with an ulterior economic motive.

(1) Mr. Crook begins with a very brief account of crystals and the general physical characters of minerals. He next explains the practical elements of crystal optics and this he does with unusual clarity. The simple chemical and blowpipe tests and laboratory methods of separation and concentration are adequately dealt with, though a little more might have been said about the employment of vertical and oblique illumination with white and monochromatic light in the study of opaque minerals in polished surfaces. Still, all this introductory matter bears the obvious mark of the experienced manipulator. The chapter on the geology of economic mineral deposits was perhaps necessary, it is of course just geology, and it was naturally impossible, in the allotted space, to give it proper treatment. In the descriptive portion of the volume the economic minerals are arranged in three groups: (1) ore minerals, (2) gem minerals, (3) miscellaneous minerals. Within each group the arrangement is alphabetical. By "ore mineral" the author means "a metalliferous mineral which owes its economic value to the fact that it is smelted to obtain a metal." This is not true, and if it were it would be misleading, for some of the metals included in this group are in practice more often extracted by electrolytic or purely chemical processes. Amongst the gem minerals are included many of little value or that are rarely employed. The miscellaneous minerals are described partly with reference to their uses, e.g., abrasives, building stones, cement materials, refractories; partly in accordance with their chemical classification, e.g., carbonates, sulphates, silicates, borates, and partly under common mineral names, e.g., asbestos, mica, clays. This section is full of information though in an abbreviated form; it is fairly well up-to-date but, as would be expected, there is some inequality in treatment; the remarks under building stones and cement materials, for example, do not take one very far; lime is mentioned under fertilisers, but there seems to be no reference to

chemical lime. Flint is almost passed by and it is not indexed. Useful determinative tables come at the end of the book. Cross references have been carefully made and the index is satisfactory, but there are no references to original authorities. Most of the illustrations are good and new.

(2) Any work from the pen of Dr. Grabau is deserving of attention and this will doubtless be true of the one now under consideration. In the author's own words, it is "essentially a treatise on applied stratigraphy." The present volume treats of the principles of salt deposition, as deduced from the study of such deposits now forming or which have but recently been formed. These principles are to be applied in a second volume to the elucidation of the older deposits. The term salt is used with a very wide connotation. The composition of natural saline waters is reviewed together with the laws governing the deposition of salts in nature. The investigations of Van't Hoff, Walther and others and the experiments of Usiglio are discussed. Different types of deposit are examined—sea-margin deposits, formations in lakes and cut-offs, cyclic or wind-borne salts, connate salts and those derived from pre-formed rock bodies. A chapter is devoted to the concentration of salts of different kinds by the vital activities of animals and plants, another to the deposits from mineral springs, fumaroles, and circulating ground-waters. The "meta salts," that is, those formed *in situ* by metasomatic processes, are disposed of rather briefly. The interesting and difficult subject of deformation in salt bodies has a chapter to itself.

As regards the principles of salt deposition, the author rather frequently avoids giving a definite lead, preferring to quote variant hypotheses and leave the choice to the reader.

Though this is only the first instalment of a rather ambitious scheme, and the final judgment upon it must be deferred, it will be found a very handy introduction to the study of salt deposits and the distribution of the younger salt formations. The numerous outline maps and references to literature enhance its value in this respect.

J. ALLEN HOWE.

TRAITE DE LA CONSERVATION ET DE L'AMELIORATION DES BOIS. By M. DE KEGHEL. *Encyclopédie Industrielle*. Pp. 360. (Paris: J.-B. Ballière et Fils. 1921.) Price 10 francs (bound 15 fr.).

There have been very few works attempting to handle this important subject as a whole, although many papers or pamphlets have been written. In the present case the author has condensed into 360 pages of a handbook an enormous amount of information which could only be dealt with in many volumes.

The matter is divided under 18 headings or chapters. The first is historical and critical, and leads up to the final paragraph which states that a rational and complete impregnation of wood is only possible by the application of a system in harmony with a knowledge of its anatomical structure and histology. These subjects are dealt with in Chapter II which shortly goes into the cause of the circulation of the sap and the course it follows. After a few remarks on the cellular and vascular tissue and the chemical composition of wood, the author proceeds to show the difficulties in the way of thorough impregnation of all parts; and, in Chapter III, how these may be overcome. He proposes to drive out the sap by a longitudinal injection of a suitable fluid. Chapter IV describes the author's plant which provides for the immersion of the log in the fluid under the same pressure as is applied to one end, whilst the other end is open to atmosphere. This ingenious arrangement is to

prevent the bursting of the wood under the high pressure necessary. Chapter V is on the selection and felling of the trees and the preparation of the logs for the special treatment, whilst Chapter VI, on the artificial ageing or senilisation of wood, is of very great interest. The changes brought about by natural and artificial ageing are explained and the reasons given for the failure of wood seasoned by the ordinary artificial methods. It describes several unsatisfactory processes which pretend to overcome these disabilities. All this leads up to the author's process of the removal of the sap and soluble constituents by forcing through the logs a weak aqueous solution of sulphuric acid of ammonia, etc., followed, after draining, by treatment with acetone. Subsequent drying in special plant results in the recovery of a very large proportion of the acetone, and the preparation of a wood which will not warp, swell or crack. The author shows that it is possible by washing to remove the hygroscopic soluble and putrescible matter from the woody structure, and that then the drying is rapid. He gives figures showing the differences in weight and time of drying of treated and untreated wood.

Chapters VII to XIII deal with fireproofing historically, chemically, and industrially. Failures are explained and the author's investigations leading up to his zinc-ammonio-phosphate solution are described.

Chapter XIV is a very long one handling the subject of wood preservation from the industrial point of view. It opens with about four pages on the causes of destruction, and then goes on to describe and criticise many of the processes which have been proposed or used for preservation. This naturally leads to the rational methods invented by the author, as exemplified by the longitudinal injection of an aqueous solution of agar-agar, formaldehyde, and ferrocyanide of potassium for railway sleepers, and a solution which will deposit sulphate of lime in the case of wood intended for paving.

Whilst the author's reasons for adopting such processes appear to be sound and to be supported by experimental data, it cannot be overlooked that he strongly condemns creosote as a preservative, making use of examples of inefficient application, and arguing that its viscosity and other disabilities make it impossible to cause it to penetrate the wood. He apparently ignores the fact that sleepers, telegraph poles, piling, and many other creosoted structural timbers have lasted much beyond their economical or mechanical life. Large fencing posts erected in 1854 are still sound. His comparative experiments with beech sleepers against white ant must be discounted. If the amount of time and care given to his agar process had been expended on the control sleepers which were creosoted, they would not have suffered.

Chapter XV is upon the colouring of wood, either to imitate others or to produce "fancy" effects. The author has given a great deal of thought to this subject, and his reasons for failures and proposals for obtaining successful results are supported by experiments. He introduces the theory of colloids to explain the unequal absorption of colouring matters, and how wood may be mordanted to render all its constituents of the opposite electric sign to that of the colouring matter. He explains how, in any haphazard mixing of colouring matters, the different viscosities of the constituents would result in selective separation in the capillaries; but he states that a complex of definite composition, more stable than either of the constituents, may be formed by mixing certain positive or basic colours with negative or acid colours.

There is a chapter on plywood, compressed wood, and bent wood, and finally, one on the installation of plants suitable for carrying out the author's ideas.