

likely to be effectual. An expenditure of one-fiftieth of the cost of the recent epidemic would probably secure the country from any such infliction in future. But we must admit that without a somewhat strict supervision at ports of entry during the period of prevalence in other countries, and without provision for the segregation of slight or suspected cases during that period, mere notification would not be likely to put a stop to the spread of influenza. The early cases are worth taking a great deal of trouble to discover and isolate. When once many cases have occurred in a locality, the further progress of so protean a disease is difficult to arrest. The best chance of averting an epidemic must be sought in scrupulous care for early isolation, in tracing the movements of travellers from infected towns, and in the increased practice of ventilation in private houses and in public gatherings. Like typhus, influenza seems incapable of inflicting much damage except through the medium of close, confined, and impure air, and where measures of isolation and disinfection are used it seldom spreads. But the infectious character of influenza must be internationally recognized before protective regulations can achieve a full measure of success.

R. RUSSELL.

GENERAL CHEMICAL MINERALOGY.

Allgemeine Chemische Mineralogie. Von Dr. C. Doelter, O. Professor der Mineralogie an der K. K. Universität Graz. With 14 Figures in the Text. (Leipzig: W. Engelmann, 1890.)

MINERALOGY, at first purely descriptive, has been raised to the dignity of an experimental science by the application of the principles of chemistry and physics. The writer of a mineralogical text-book is thus met at the outset with the difficulty of deciding what amount of knowledge of chemistry and physics to assume in his reader. With regard to the chemical side at least, the rule appears to be to assume that he knows very little, and yet, somewhat inconsistently, to make the exposition of the atomic theory and the fundamental principles of chemistry so brief as to be of little service to one who has had no previous acquaintance with the subject.

The author of the present, in many respects useful and suggestive, book follows the same lines. The whole account of the fundamental chemical theories occupies about ten pages of the introduction. The same fault will be found in other parts of the book: *e.g.* it would be difficult to say to what class of reader a large portion of the chapter on chemical analysis would be useful. In his endeavour to introduce as many extracts as possible from the current literature of the subject, the author allows himself in many places to become somewhat sketchy. In spite of this, the book, with its wealth of information upon points which have not hitherto found a place in ordinary mineralogical text-books, will be found to give a very good idea of the present state of mineralogical science from a chemical point of view.

The arrangement of the book is in seven sections, viz. (1) introduction; (2) chemical crystallography; (3) chemical analysis of minerals; (4) synthesis of minerals; (5) metamorphism of minerals; (6) formation of minerals

in nature; (7) chemical composition and constitution of minerals.

In the introduction, containing an account of the atomic theory and its consequences, one or two suggestive ideas will be found: *e.g.* the correspondence, pointed out by Tschermak, between the chemical law of multiple proportions and the crystallographic law of simple parameter ratios; and also the analogy between the law of constant proportion by weight and the fundamental crystallographic law of constancy of angle. The subject of chemical crystallography receives very full treatment. Here the reader is initiated into the mysteries of chemical and physical isomerism, polymorphism, enantiotropy, isomorphism, isodimorphism, isogonism, morphotropy, &c.; and if the perusal of this section, as well as of the last, on the constitution of minerals, shall leave him with a rather confused and unfavourable idea of the subject, the fault should perhaps be rather attributed to the present imperfect state of our knowledge than to the author. At present it is in most cases impossible to say whether bodies are polymeric, metameric, or chemical isomers.

As regards isomorphism, if the formation of mixed crystals is to remain the test, the original definition of Mitscherlich must be modified to suit the fact of the formation of mixed crystals from compounds of not precisely analogous chemical composition. Thus, according to modern views, isomorphism is in some degree to be deposed from its proud position as an infallible guide to chemical composition. The insidious nature of the attack upon this ancient stronghold of the faith may be judged by a comparison of one of the latest definitions of isomorphism with the original definition of Mitscherlich. According to the latter, isomorphism is the power which two or more compounds of *analogous* chemical composition possess of crystallizing in the same or similar crystalline forms, and of mixing in varying proportions to form homogeneous crystals. The latest definition is that bodies are isomorphous which, with *for the most part similar* chemical composition, possess the property of crystallizing in similar crystalline forms, and of forming mixed crystals which morphologically and physically graduate into each other. Such a change it is expected would lead to a considerable simplification in many of the formulæ which have been made unnecessarily complicated in order to comply with the requirements of Mitscherlich's definition.

The section on chemical analysis of minerals is one of the least satisfactory in the book. Short summaries of analytical methods can be of little service to any class of reader. Amongst matter which will not be generally found in the ordinary chemical text-book, this section contains some account of microchemical reactions, of the methods for the mechanical separation of minerals, so as to insure pure material for analysis, and directions for the course of analysis to be pursued in the case of the more important minerals.

The important subject of mineral synthesis receives more complete treatment than any other in the book. The section contains general accounts of the various methods for the artificial production of minerals by chemical reactions, fusion, sublimation, electrolysis, diffusion, &c., with detailed descriptions of the apparatus required.

The sections on the metamorphism of minerals, and on the formation of minerals in nature, will be found of great interest to the petrologist. Here are described the effects on minerals of heat, of gases at high temperatures, of fusion, of fused magmas, of water containing carbonic acid, &c. In the last section, dealing with the composition and constitution of minerals, the present imperfect state of our knowledge is brought prominently to light. The battle is still being fought between the so-called chemical, liquid, and crystal molecule; between constitutional and empirical formulæ. Mineralogists are beginning to understand that it is impracticable to attempt to use for complicated minerals principles which are only applicable to volatile organic compounds, and the idea is gaining ground that many minerals are molecular compounds only capable of existing in the solid state, the crystal molecule being built up of different chemical molecules.

The author intends to supplement the present work by another, entitled "Chemical Mineralogy," in which the composition, synthesis, &c., of each individual mineral will be treated more particularly. The present volume is intended as quite a general treatise on the subject of mineral chemistry; in fact, we cannot help thinking that in many parts the treatment is far too general, and that the book has been partially sacrificed for the sake of the volume that is to follow. The value of the book is increased by the lists of references to the literature which precede each section.

G. T. P.

OUR BOOK SHELF.

Bush Friends in Tasmania: Native Flowers, Fruits, and Insects, drawn from Nature, with Prose Descriptions and Illustrations in Verse. By Louisa A. Meredith. Executed by Vincent Brooks, Day, and Son. (London and New York: Macmillan and Co., 1891.)

UPWARDS of thirty years ago Mrs. Meredith gave the world a volume containing admirable coloured figures of a selection from the many beautiful plants and insects that inhabit her island home, Tasmania; and now, in the evening of a long life, she has travelled to the old country to publish a second volume, which is to be the last. Her purpose achieved, she "hopes to return and end her days among her children in that pleasant colony," which has given a brighter home to so many of our kith and kin. Lovers of the beauties of Nature in this country will find much pleasure and instruction in this second volume from that talented lady's pen and pencil, and will be able thereby to form some conception of the totally different kind of vegetation from our own that clothes this remote southern island, as well as the great Australian country, for it is only a part of the same flora. To the colonists themselves the book will be even more attractive, as a means of becoming acquainted with the names and affinities of the beautiful objects with which they are surrounded. It will also, it is to be hoped, teach them to prize and preserve these rare and precious gifts. Like all true lovers of Nature, Mrs. Meredith deprecates the wanton destruction of rare flowers near Hobart by thoughtless or greedy persons whose only aim seems to be quantity.

The botanical part of Mrs. Meredith's book is perfectly trustworthy, having been scrutinized by so eminent an authority as Sir Joseph Hooker; and Prof. Westwood furnished the names of the insects.

Some of the poems have a special interest in connection with the early history of the settlement of Tasmania.

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Notably an "Old Story" of 1834, which narrates the massacre by aborigines of a whole family—father, mother, and seven children.

The Elementary Geometry of Conics, with a Chapter on the Line Infinity. By C. Taylor, D.D. (Cambridge: Deighton, Bell, and Co., 1891.)

DR. TAYLOR'S "Geometry of Conics" is so well known, and has met with such acceptance—this is the seventh edition, revised—that we are not called upon to give a detailed account of it. Two additions, however, claim a brief notice. A new chapter (xii.) contains "a course for beginners," in which students who prefer to take the three conics separately have a selection of articles, from the text, indicated for a first reading. Further, a set of duplicate proofs is given in outline, the completion of which is left to the reader. The other novelty (chapter xi.) is "a new treatment of the hyperbola." This is the expansion of a paper which the author read before the Association for the Improvement of Geometrical Teaching, in January 1890, and of which the President (Prof. Minchin) is reported to have said: "One thing that struck him about the paper was, that Dr. Taylor arrived at points on the curve in a very much more rapid and simple way than any he had previously known of." The author remarks that it is in accordance with the historical order to draw the asymptotes before tracing the curve, for the hyperbola seems to have been discovered from its "equation" (A.I.G.T. Report, 1890, p. 12).

It is somewhat remarkable that Dr. Taylor does not give a proof of this equation. We append one. Taking his figure on p. 103, we draw the second asymptote. Now draw PM parallel to C*p*, cutting the axis in K, and the second asymptote in M: then,

$$\begin{aligned} 4CM \cdot MP &= 4MK \cdot MP = (MP + MK)^2 - (MP - MK)^2 \\ &= C*p*^2 - KP^2 = \lambda^2(pN^2 - PN^2) \text{ (where } \lambda \text{ is a constant)} \\ &= \lambda^2(S*p*^2 - SP^2) \\ &= \lambda^2(S*p*^2 - *pY*^2) = \lambda^2 \cdot SY^2 = Ca^2 = a^2 + b^2. \end{aligned}$$

Again, let PQ be any chord meeting the asymptotes in *p, q*; and let Q*l*, P*m*, parallel to C*p*, C*q* respectively, meet those lines in *l, m*. Then we have

$$\begin{aligned} \frac{Pq}{Cm} &= \frac{P*p*}{P*m*} = \frac{p*q*}{C*p*} = \frac{Q*q*}{Q*l*}, \\ \therefore \frac{Pq}{Qq} &= \frac{Cm}{Ql} = \frac{Cl}{Pm} = \frac{pQ}{P*p*}; \end{aligned}$$

hence

$$P*p* = Q*q*, and P*q* = *pQ*.$$

Other properties occur to us, but the above are classic properties of the curve, and the wonder is that Dr. Taylor has not applied his new treatment to obtain them. There is no suggestion that they can be so obtained, either in the book or the original paper as printed in the A.I.G.T. Report.

R. T.

Les Engrais Chimiques. Par Georges Ville. Septième Édition. (Paris: M. Engel, 1890.)

THIS is a new edition of the author's lectures on chemical manures, which were first published in 1868, and which have been translated into seven languages. An English edition, by Mr. Crookes, was published in 1879. The sixth French edition has been out of print for about ten years, and during that time the price of chemical manures has considerably declined, on an average about 40 per cent. On this account the author has introduced, at the end of the volume, a chapter containing new formulæ for mixed manures, based on considerations of market value and more complete knowledge of the requirements of