

of special importance to junior students of chemistry. Examples are given on the metric system, thermometric scales, specific gravity, the gaseous laws, the weights and volumes of materials entering into chemical reactions, and on the calculation of the empirical formulæ and percentage composition of compounds. As distinguished from others on the same subject, the book contains no more than the beginner requires, and is therefore less apt to confuse than one more elaborate. The introductory part of each section, giving the principles involved in the exercises, is clear, and the examples, 128 in all, seem well chosen. A table of contents, index, and answers, are included. A few points in connection with specific gravity might with profit be attended to. On p. 6, density, in reality absolute density, is defined, and then specific gravity. Relative density, as it is referred to on p. 31, might here be introduced, and the account would be more complete if the relation between density and specific gravity were clearly stated. After the formula  $s = w/v$ , on p. 9, it might be definitely pointed out that, with the units chosen, specific gravity is the weight of unit volume. It is not quite accurate to lead the student, as on p. 8, to infer that specific gravities are usually given for the temperature of 4° C.

*The Colliery Manager's Hand-book.* A Comprehensive Treatise on the Laying-out and Working of Collieries, designed as a Book of Reference for Colliery Managers, and for the use of Coal-mining Students preparing for First-class Certificates. By Caleb Pameley. Pp. 552, Index, and 472 Woodcuts. (London: Crosby Lockwood and Son, 1891.)

No doubt colliery managers, and students preparing for examinations, would find it convenient to have a cyclopædia of mining, but the hand-book under consideration will scarcely satisfy their wants. The work is another illustration of the proverb, "Ne sutor ultra crepidam." Instead of being satisfied with describing mining processes and mining plant, the author deliberately plunges into geology and chemistry, and then finds himself quite out of his depth.

It is evident that much labour has been expended in bringing together information upon various matters connected with coal-mining; but there are gaps which require to be filled up, and errors that should be corrected in a second edition. For instance, the chapter upon boring is meagre. The part relating to percussive boring is in the main borrowed from Greenwell, and refers solely to boring by hand. Not a word is said about free-falling tools. It is not correct to say that "a great advantage of the diamond-drill boring is that the hole is kept true and vertical." The surveys made with the ingenious "clinograph" of Macgeorge have shown beyond a doubt that this is not invariably the case.

The description of tools is insufficient; and strange to say, the book contains no figure of a pick. Probably no work on mining was ever written before without a figure of this characteristic miner's implement. It is not for want of space, because there are figures to illustrate the manner of preparing oxygen and nitrous oxide. These are really unnecessary: if the student wants to learn a little elementary chemistry, he had better have recourse to one of the numerous text-books on that subject.

The examples of the different methods of working coal are likely to confuse students, owing to the mass of details by which they are accompanied. As the original articles are available in the Transactions of the Mining Institute of Scotland, short abstracts would have been quite sufficient.

Serious omissions are somewhat numerous. Rittinger pumps, which are doing such excellent work on the Continent, are not mentioned; and the following important subjects are also entirely ignored: coal-washing, coking,

utilization of the gases for making tar and ammonia, and manufacture of patent fuel. In these days, when warning notes are being sounded concerning the duration of our coal supply, the attention of mining engineers and students should be specially directed to methods of turning small coal and inferior seams to profitable account. The author of a hand-book ought to be in advance of the times, and point out the path of economy and progress.

In spite of its defects, Mr. Pameley's work is by no means destitute of value. It contains a great deal of information which managers and students will find of use to them, and the excellent index will enable them to lay their hands at once on any part they desire to consult.

C. L. N. F.

*Photography applied to the Microscope.* By F. W. Mills. (London: Iliffe and Son, 1891.)

THE subject of photo-micrography is one of such absorbing interest that it is no wonder it has become so popular among amateurs. For those commencing, and for those who have already made some steps in pursuing this subject, the present little book is intended, and it will be found to contain just that sort of information and advice that is so necessary to a beginner. The main point to insure good photographic results lies in the preparation of the object, which requires both patience and care; the chapter dealing on this has been written by Mr. Charters White, who gives good directions for cutting hard and soft tissues, and for bringing materials, that are too soft in their natural condition, to a state of firmness previous to cutting. With regard to the choice of the necessary apparatus, the author describes various forms that are cheap, and which with care can be made to yield fair results. In the remaining chapters all the photographic manipulations are dealt with, such as exposing, developing, and printing, &c., and at the end is added a useful list of works which treat of the subject under consideration.

*Copernic et la Découverte du Système du Monde.* By Camille Flammarion. (Paris: Marpon and Flammarion, 1891.)

AN interesting book is this, and one full of information. In ten chapters and 250 pages M. Flammarion traces the history of astronomy from Copernicus to Newton, with special reference to the life of the former and the development of his system. There is little doubt that this work will be as well received as others by the same writer, and it really deserves the favour.

G.

*Annals of British Geology, 1890.* By J. F. Blake. (London: Dulau and Co., 1891.)

IT is intended that this shall be the first issue of an annual publication; and, if future volumes are prepared with as much care as the present one, the work ought to be of much service to geologists. Its scope is restricted to writings which have appeared in the United Kingdom. The author is not content with noting merely the titles of the works he records. When they are of the least importance, he gives a general idea of their contents, and presents what seems to him an adequate critical estimate of their value. The classification is by subjects. He begins with general geology; then come stratigraphical geology, palæontology, palæobotany, petrology, economics, maps and sections, and works relating to foreign geology, but published in Britain. A section headed "Personal Items" brings together a number of facts to which it may sometimes be convenient for the student of geology to refer. The volume deserves to be all the more cordially welcomed because Mr. Blake is not of opinion that he has at one stroke reached perfection. He hopes that future volumes may be improved by the co-operation of specialists in the several departments.