

prised to see the nephoscope, nor is maker or price indicated in the list of instruments. It is a pity to put a doubly-folded sheet like that in Chapter III. in a school-book. It will certainly be torn in the first year. By printing on both sides one fold might have been avoided and there is no good reason why all the data might not have been printed in the text as wanted day by day.

The fact that so many problems are worked out in the book makes it easier reading but will require the books to be closely watched in the class-room.

The Weather Bureau Meteorological Tables are inserted at the end of the book with an excellent appendix on the 'Equipment of a Meteorological Laboratory.'

The book should prove valuable to every teacher of meteorology.

M. S. W. JEFFERSON.

ELMWOOD, MASS., December 19, 1899.

*Bacteria*, especially as they are related to the Economy of Nature, to Industrial Processes and to the Public Health. By GEORGE NEWMAN, M.D., Demonstrator of Bacteriology, King's College, London. The Science Series. New York, G. P. Putnam's Sons; London, John Murray. 1899. Pp. 348.

The fact that bacteria are concerned in a variety of natural processes and do not devote themselves exclusively to the causation of disease is beginning to touch the popular imagination and to create a demand for treatises that shall deal with the subject of bacteriology from a general biological standpoint rather than a strictly medical one. An attempt to meet this need has been made in the present instance. Dr. Newman discusses, under separate chapter-heads: The Biology of Bacteria, Bacteria in Water, Bacteria in the Air, Bacteria and Fermentation, Bacteria in the Soil, and Bacteria in Milk, Milk Products and other Foods. These six chapters cover 239 pages out of 348. A chapter is then given to The Question of Immunity and Antitoxins, which is followed, by what seems a singular inversion, with one on Bacteria and Disease, and the book ends with a chapter on Disinfection. Many topics of great interest are considered in these pages, and the

author's selection of material and mode of treatment will command general approval. The book is marred, however, by a lax and involved style and contains so many errors of statement as to call seriously for revision. On page 30, for example, it is stated that "boiling for thirty to sixty minutes will kill all bacilli and all spores," and on page 79, "moist heat at the boiling point maintained for five minutes will kill all bacteria and their spores." These statements are not in accord and neither is correct. On page 16 it is erroneously stated that "*Micrococcus agilis* is the only coccus which has flagella and active motion." In the description of Van Ermengem's method of staining flagella (p. 63) it is probably through a typographical slip that a 25.5 per cent. solution of silver nitrate is recommended, and surely the use of boric acid in place of osmic acid in the fixing bath is an unusual procedure. It is hardly a careful form of statement to refer to the power of the tetanus bacillus to produce disease as its 'regular function' (p. 32). The author's definition of the antitoxin unit (p. 263) is incorrect. It is not necessary to multiply instances, but it is to be hoped that subsequent editions may find some of these blemishes removed, since they unquestionably impair the value of an otherwise interesting and useful book.

Two examples of the author's somewhat enigmatic style may be given: "Yet, whilst this general fact is true, we must emphasize at the outset the possibility and practicability of securing absolutely pure sterile milk. Recently some milking was carried out under strict antiseptic precautions, with the above sterile result" (p. 181). "*Budding* occurs in some kinds of yeast, and would be classified by some authorities under spore formation, but in practice it is so obviously a 'budding' that it may be so classified" (p. 16).

E. O. J.

*A Treatise on Crystallography*. By W. J. LEWIS, M.A., Professor of Mineralogy in the University of Cambridge. Cambridge Natural Science Manuals, Geological Series. Cambridge: At the University Press. 1899. 4to. Pp. xii + 612.

This new text-book of crystallography presents the modern views as to the classification of

crystals based on the principles of symmetry. It is devoted exclusively to the geometrical relations of crystal forms and to methods of determining these relations and of representing them graphically.

In the first nine chapters the general properties of crystals are described, including very full discussions of symmetry relations and of the properties of zones. The discussion is geometrical rather than analytical and follows more or less closely the treatises of Miller and Story-Maskelyne. In Chapters VI. and VII., treating of crystal drawing and methods of projection, no mention is made of the gnomonic projection, which now occupies an important place in crystallographic discussion.

The treatment of the general optical and physical properties of crystals of the different systems contained in Chapter X. is very brief and seems hardly adequate in a work of this character.

Chapters XI. to XVIII. are devoted to descriptions of the thirty-two classes of crystals. The classification of these types is essentially that of Groth. A feature of this part of the work is the presentation of a great many examples of crystals of various substances in each class, each crystal being worked out in detail with all the logarithmic computations necessary for the determination of its elements and the indices of its forms. Directions for drawing the forms are also not infrequently given after their determination, and a great deal of useful information in practical crystallography may be found scattered through these examples. But their number seems rather more than necessary, adds very much to the bulk of the book and so scatters the desired information as to reduce its usefulness.

In the final chapter on Goniometers but scant justice is done to the theodolite goniometer, no reference being made to the admirable graphic methods of discussing measurements made with it developed by Federow and Goldschmidt.

A complete index concludes the volume. The excellent typography and text figures deserve a word of praise.

The book hardly commends itself to beginners in crystallography, being too elaborate in its treatment and too mathematical in its pres-

entation. Its greatest service will be to more advanced students doing practical work in the study of crystals.

C. PALACHE.

#### SCIENTIFIC JOURNALS AND ARTICLES.

THE contents of the *American Journal of Science* for January are as follows:

'Products of the Explosion of Acetylene,' by W. G. Mixture.

'Glaciation of Central Idaho,' by G. H. Stone.

'Pogonia Ophioglossoides,' by T. Holm.

'Graftonite, a new Mineral from Grafton, New Hampshire, and its Intergrowth with Triphylite,' by S. L. Penfield.

'Explorations of the *Albatross* in the Pacific Ocean,' by A. Agassiz.

'Analyses of Italian Volcanic Rocks, II.,' by H. S. Washington.

'Constitution of the Ammonium Magnesium Arseniate of Analysis,' by M. Austin.

THE *Astrophysical Journal* for December contains the following articles:

'Robert Wilhelm Bunsen,' by Henry Crew.

'The Wave-Length of the Corona Line,' by C. A. Young.

'Density of Close Double Stars,' by Alexander Roberts.

'The Densities of the Variable Stars of the Algol Type,' by Henry Norris Russell.

'Note on the Spectrum of *P. Cygni*,' by A. B  lopol-sky.

'Apparatus and Method for the Photographic Measurement of the Brightness of Surfaces,' by J. Hartmann.

'The Great Sun-Spot of September, 1898,' by J. F  nyi.

'A Spectroscope of Fixed Deviation,' by Ph. Pellin and Andr   Broca.

'Researches on the Arc-Spectra of the Metals,' by B. Hasselberg.

THE contents of *Appleton's Popular Science Monthly* for January include 'The Advance of Astronomy in the Nineteenth Century,' by Sir Robert Ball, 'The Applications of Explosives,' by Professor C. E. Munroe, 'Scenes on the Planets,' by Mr. Garrett P. Serviss, Professor Ward on 'Naturalism and Agnosticism,' by Mr. Herbert Spencer, and 'Old Rattler and the King Snake,' by President David Starr Jordan. The *Monthly* is somewhat altered in appearance, and the price is \$3.00 per annum. We trust that its influence may be correspondingly increased.