

surveyors. The treatise is a most satisfactory one for its purpose; its author is known as not only an authority and in all respects competent, but as one of the most accurate and painstaking of writers. His work will undoubtedly find its place promptly, and will be adapted for purposes of instruction in many schools of the higher class, and will supply multitudes of young engineers with the facts and methods that they require in their practice.

Coals and Cokes in West Virginia: a handbook on the coals and cokes of the Great Kanawha, New River, Flat Top and adjacent districts in West Virginia. By WM. SEYMOUR EDWARDS. Cincinnati, R. Clarke & Co. 162 p.

MR. SEYMOUR has collected in this book a great mass of statistical and geological information which cannot fail to be useful and valuable to all who are interested in the West Virginia coal-fields. In the first chapter a brief review is given of the coal-measures as they occur in the southern part of the State, and this is followed by chapters giving details of numerous sections. We have first tables of vertical sections giving the name used by the Pennsylvania Survey, the local name, height or thickness, material, etc.; then tables of chemical analyses, tables showing comparative gas-yielding power, steam-producing power, and chemical analyses and physical tests of coke. This closes part one.

In part two we have sketches of various districts and tables showing the output, cost of production, transportation, and average prices obtained in a series of years. In these days of pools and combines by railroads, and of trusts by manufacturers, it is of interest to note the immense difference in cost of transportation when water and land carriage is considered. The Great Kanawha River has been improved under the auspices of the general government by means of locks and dams so as to afford continuous transportation facilities for about ten months out of the year. The most of the dams in the river are "movable," that is, can be lowered to the bottom of the stream in high water and raised when the river falls, so as to afford a constant depth of six feet.

The coal is carried in barges averaging about 500 tons, or between 12,000 and 13,000 bushels. Four barges can be easily handled by a tow-boat in the locks, and from 4 to 14 in the open river; while on the Ohio from 14 to 34 barges are taken by a single tug. Thirty barges contain about 15,000 tons, equal to a continuous train of 20-ton railroad cars $5\frac{1}{2}$ miles long. The rate of towing this coal from Charleston, W. Va., to Cincinnati, a distance of 263 miles, is only 25 cents per ton, or, to those who hire barges and so pay rent for them, $37\frac{1}{2}$ cents per ton. To Louisville, 394 miles from Charleston, the rate, including rent, and the return of barges, is 48 cents per ton, or $1\frac{21}{100}$ mills per ton per mile. For the longer distance to New Orleans, 1,776 miles, the cost is \$1.25 per ton, or $\frac{1}{4}$ of a cent per ton per mile. Contrast this now with the cost of railroad freight from New York to Chicago, 913 miles, and we have \$4.50 per ton, or 5 mills per ton per mile, against $\frac{1}{10}$ of a mill per ton per mile for 1,776 miles to New Orleans. Surely nothing can show more clearly the value of water carriage to the community as a whole, and no better argument could be advanced in favor of the continued development of our river, canal, and lake navigation.

JOSEPH F. JAMES.

Washington, D.C., Dec. 10.

A Manual of Physics. By WILLIAM PEDDIE, D.Sc., F.R.S.E. New York, G. P. Putnam's Sons. 501 p. 8°.

THE language of mathematics is noted for precision and conciseness; but, with its incomparable advantages, both for expression and for reasoning, it offers a barrier to many minds as forbidding as any Chinese wall. One reader of physics enjoys brilliant lecture experiments, another desires a guide to accurate laboratory measurements, but neither phase is apparent in this volume. It is offered as "an introduction to the study of physical science, designed for the use of university students." With little description of apparatus or manipulation, it presents an orderly view of the several topics, setting forth the unity of natural philosophy, and tracing the results of observation to the kinetic

CALENDAR OF SOCIETIES.

Anthropological Society, Washington.

Dec. 20.—Symposium, Is Simplified Spelling Feasible? Discussion by Professor F. A. March of Lafayette College, Hon. A. R. Spofford, Hon. Wm. T. Harris, Hon. Edwin Willis. The discussion will be continued Dec. 27 by the remaining speakers.

Reading Matter Notices.

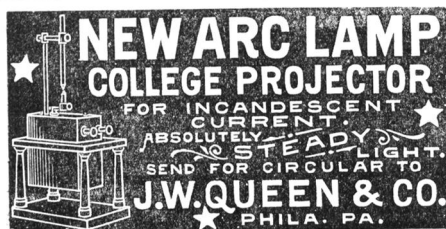
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hypotheses which best explain them. The more important formulas of differential and integral calculus are deduced in an early chapter (of only 15 pages) on "varying quantities." This is well written for review, but less adapted to the student who is unfamiliar with calculus. The next chapter discusses vectors, composition of motion or velocities, harmonic motion, etc., as preliminary to mechanics, gravitation, and the properties of matter. While the phenomena and the laws of sound, light, heat, and electricity are taken up in succession, the essential unity and interdependence of the several subjects are kept in view. Thus many of the terms and formulas which we usually associate with statical electricity are discussed in connection with gravitation.

Among the interesting topics are Thomson's hypothesis of vortex atoms, Maxwell's electro-magnetic theory of light, and the several theories of ether.

References to original papers, and problems to be solved by the student, might have been desirable features, but would have increased the size of the volume. A very large range of physical science is comprised within moderate space; and this is confidently recommended to those who enter into the beauties of mathematical thought.

ROBT. B. WARDER.

The Woodworkers' Manual. By C. R. TOMPKINS, M.E. The author, Dover, N.H.

THIS is a pamphlet of sixty pages containing a condensed account of the machinery and processes of woodworking, by an author evidently practically familiar with the subject. He gives a plain and simple account of the best practical methods of planning and building the woodworking "plant" and of placing its machinery. The most usual and standard forms of woodworking machinery are described, and "practical instructions for the care, management, and preservation of the machinery" are given. Illustrations of the tools employed are also given. The paper is printed in good style, and it would be worth while, one would think, to double its extent and bind it up. The good sense of the author is seen in his remarks about the use of lubricants.

He thinks that there is "no economy in saving five dollars on the price of a barrel of oil, and losing ten dollars, in consequence of its use, in extra repairs; which is in most cases a fact."

AMONG THE PUBLISHERS.

PROFESSOR E. A. SMITH, State Geologist of Alabama, has recently published a "Sketch of the Geology of Alabama." In it are given descriptions of the various geological formations outcropping, with mention of the economic products found in them. In this regard the most valuable rocks are the crystalline schists of Archæan age, and the Coal Measures. From the former are derived many varieties of minerals and from the latter large amounts of coal. The Clinton or Red Mountain formation is also of value for the large quantity of iron ore it contains. The formations occurring in the State and treated of with more or less fullness, are Archæan, Cambrian, Silurian, Devonian, Carboniferous, Cretaceous, Eocene, Miocene, Pliocene (?), Pleistocene, and Recent. The pamphlet will prove useful to geologists in general and the citizens of Alabama in particular.

— Professor Merwin-Marie Snell, who is one of the few specialists in comparative religion to be found in the United States, and who has been known for some years as a writer and lecturer on that and other anthropological subjects, has recently severed his connection with the University at Washington, for the purpose of giving his attention to the conducting of a magazine devoted to the comparative history of religions and the archæology, philology, history, philosophy, religion, and literature of the Asiatic peoples. The leading specialists of Europe and America will be found among the contributors, but it is intended to give the periodical enough of a popular character to make it acceptable to the general reader as well as to the serious students of the sciences concerned. The name of the magazine will be *The Oriental Review*. It will be a bi-monthly, with a subscription price of two dollars a year. The publication office is at 2,128 H Street, N. W., Washington, D. C.

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For sale or suitable exchange.—A spectrometer made by Fauth & Co., Washington, D. C., according to the plan of Prof. C. A. Young. This instrument is suitable for the most advanced investigations and determinations. Cost originally \$700 and has been used but little. Will be disposed of at a considerable reduction. Address Department of Physics, Ohio University, Athens, O.

I will send British land and fresh-water shells in return for those of America, any part, sent to me. I have at present about fifty or sixty species, with many varieties. W. A. Gain, Tuxford, Newark, England.

The Biological Department of Hamline University desires to offer microscopic slides of animal tissues, or whole animals, in exchange for first-class fossils. Address correspondence to Henry L. Osborne, Hamline University, Hamline, Minn.

For sale.—A set of the *Berichte der Deutschen Chemischen Gesellschaft*, from Jan. 1, 1877, to Jan. 1, 1892, bound in twenty-six volumes to Jan. 1, 1888 and remaining four years unbound. Also the *Bulletin de la Société Chimique de Paris*, from Jan. 1, 1879, to Jan. 1, 1892, bound in eighteen volumes to Jan. 1, 1888, and remaining four years unbound. Dr. Marcus Benjamin, care of D. Appleton & Co., 1 Bond St., New York City.

For Sale.—A new Model U. S. Army Hospital Microscope (Zeitmayer), also $\frac{1}{4}$ -inch and $\frac{1}{2}$ -inch Objectives. HENRY C. WELLS, 151 Broadway, New York.

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A GRADUATE ENGINEER will give instruction evenings in geometry, trigonometry and surveying, mechanics, physics, mechanical drawing and general engineering construction. Five years' experience in field and editorial work on engineering journal. References furnished. C. S. H., 102 Tribune Building, New York.

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The American Geologist for 1893.

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