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 coalfields. 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 5½ 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, 37½ 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 $\frac{1}{14}$ 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 $\frac{7}{10}$ 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 descripti n 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 Willits. The discussion will be continued Dec. 27 by the remaining speakers.