

in which he declares that "the implements all belong to the older stone age," he states that "numerous pieces of burnt pottery gave further evidence of the existence of man in the cave."

In brief, we miss any indication of the employment of the strictly scientific methods of conducting explorations, according to which the exact depth and position in which each object was found are noted, whether it was covered by a floor of stalagmite or not, and what articles were found together; and we have instead only a jumble of miscellaneous remarks, however interesting in themselves. The plates are beautifully executed, and are valuable, especially those in which the animal remains are delineated; but the half-dozen devoted to archeology represent nothing absolutely novel, although several important specimens are figured. A number of human skulls and bones have been found in the different caves, which have been submitted to Professor Virchow's examination; and an elaborate account is given of his careful study of them. He reports that he finds nothing to indicate a high antiquity for them, and no material differences from the form of skull of the present inhabitants of the country: in short, there is nothing to prove that they are not the result of intrusive burials, and consequently not of the same age as the implements occurring with them.

Two interesting facts we find mentioned: one is the enormous amount of the remains of the cave-bear, discovered by Dr. Römer in the cavern explored by him, amounting to as many as one thousand individuals; the other is the proof obtained of the co-existence of man and the cave-bear from the finding of a vertebra of the bear, and an undoubted flint implement, embedded side by side in the same solid crystalline stalagmite. It is evident, from the general result of the explorations, that the caves were inhabited almost exclusively in neolithic times; although Professor Römer thinks that the occupation continued into 'the bronze age.' But the fibula figured by him in proof of this is plainly Roman; and in one cavern, even glass beads were found at a considerable depth in the deposit. Complete evidence of the very late occupation of one cavern, at least, is afforded by the discovery in it of a *denarius* of Antoninus Pius, of the year 140. But there is nothing remarkable in this, as Roman coins have frequently been found in the neighboring province of Silesia; and a hoard of early Greek coins was recently dug up near Bromberg, in Posen, on the lower

Vistula. Their presence is to be traced with the greatest probability to the traffic in amber, which has existed from the remotest antiquity, and for which the trade route lay directly up the valley of the Vistula to Königsberg, in whose neighborhood similar finds have occurred.

The author states in his preface, that he had "the determination of undertaking a thorough investigation of these caves," but that he regrets, that, with respect to "the specimens found, it cannot always be positively stated from which bed in the caves they were taken; but the same is the case with most of the caves which have been excavated in Germany." We can but regard such a statement as this as disgraceful to German science, if true; and it certainly is not true of cave-explorations in other countries.

ILLINOIS COAL-PRODUCTION.

Statistics of coal-production in Illinois, 1883: A supplemental report of the State bureau of labor statistics. JOHN S. LORD, secretary. Springfield, Rokker pr., 1883. 144 p., 2 maps. 8°.

THIS report, published in advance of the regular biennial report of the bureau for 1884, makes quite a comprehensive showing in regard to the coal-production of the state, and demonstrates the increasing value of the industry. Since 1870 the output of coal in Illinois has increased from more than two and a half millions of tons to more than ten and a half.

In the introduction, Illinois is stated to have no equal, in the states west of Pennsylvania, in the extent of its coal-fields, the abundance and accessibility of its deposits, in its transportation facilities, or in its annual contribution to the fuel-supply of the country. As to the extent and accessibility of the coal-fields, and the facility of transportation, this statement is undoubtedly correct. Albert Williams, jun., in the 'Mineral resources of the United States,' estimates that the state contains a total of 28,845,000,000 tons of coal. The numerous railroads with good grades furnish cheap transportation, and in Chicago and St. Louis the requisites of two great central markets are found. As far as the production is concerned, Illinois is perhaps equalled by Ohio. The statistics of the latter for 1883 are not at hand, but the rate of increase is probably about the same in the two states. Mr. Joseph Nimmo, in the abstract of statistics for 1883 (published by the U. S. treasury department), gives the production of coal in Ohio for 1882

as 9,450,000 tons; while Mr. Lord, for the same year in Illinois, gives 9,115,653 tons. Coal is mined in forty-nine counties in Illinois; and the number of mines is 639, employing nearly 24,000 men and a capital of \$10,396,540. The production was 10,508,791 tons for 1883, valued at \$15,310,521. This was an increase of 1,393,414 tons over the output of 1882. The average value per ton of the coal at the mines has been \$1.46 for the past three years. There has been a marked decline since 1870, when it was \$2.32.

The report gives a statistical summary for the state; the complete statistics of each county arranged in alphabetical order; and a comparative table for 1882 and 1883, showing the number of men employed, the product in tons, and the average and aggregate values.

There are also papers on 'Miners' wages,' and 'Casualties in mines;' and a detailed description of 'the Diamond-mine disaster at Braidwood,' with a diagram of the mine, is given. The subject of state legislation in the interest of the miners is considered, and statistical tables of the various inspection districts are presented, illustrated by a map showing their boundaries. These are followed by a list of the railroads in the state on the lines of which coal is found, with the names of the towns and stations on each where it is mined and shipped.

The average wages received by the miners is stated to be ninety cents per ton. During the year, 365 casualties occurred, involving the loss of 134 lives. This was at the rate of one for every 78,424 tons of coal, or one man in every 146 employed under ground. The catastrophes at Braidwood and Coulterville, in which 79 lives were lost, of course swells the list, and makes it exceptional; but, leaving them out, one life was lost for every 192,887 tons of coal taken out, which is an excessive death-rate for mines as free from explosive gases as the mines of Illinois are. In the bituminous mining-region of Pennsylvania the average for 1882 was one death to every 277,124 tons of coal mined; and in Great Britain the statistics for eight years, ending with 1880, show that for every 143,667 tons of coal taken out there was an average of one death.

In the Illinois mines the larger number of the miscellaneous accidents are caused by the falling of the roof, against which, as the report says, the miners are usually able to protect themselves. Familiarity with the danger, however, leads them in many cases to neglect the setting of props. Twelve of the 365 accidents were due to gases.

The report concludes with an enumeration of the state mining-laws.

Although residents of Illinois will be especially interested in this report, there is a great deal of material in it that is of general interest and practical value.

CARPENTER'S ENERGY IN NATURE.

Energy in nature: six lectures upon the forces of nature and their mutual relations. By W. L. CARPENTER. London, Cassell, 1883. 15+212 p., illustr. 12°.

WHEN a man has been driving a butcher-wagon, or throwing trunks, or wading about in the cold and wet all day, and has no attractive fireside to retreat to in the evening, it must be comforting to find a well-warmed and brightly lighted hall standing open, with a platform at one end loaded with bright apparatus, and curiously colored diagrams on the walls.

The weary man walks in and takes his seat among a crowd of equally curious men, or only equally weary if *habitués*, and after rubbing his hands, and smoothing his hat across his knees, gives a few furtive glances at the lecture-table, and awaits events.

Over the uppermost diagram there is posted in the boldest letters, 'Energy in nature.' Our tired friend has a flickering thought that it might be well if there were no energy in nature. With Nature he was acquainted when a boy, possibly, and has a certain system of philosophy in regard to her workings. He once saw a man who could discover springs of good water by means of an apple-twig. He has leaned his head against telegraph-poles to hear the despatches, or has watched for them as they passed on the wire. He has always been taught that each 'new moon' is a new moon, and, to the best of man's knowledge, made of some common substance necessarily. He is not aware that any of these cherished notions are to be jarred this evening; and, thanks to soothing sleep, they may not be.

The lecturer appears, — a man well acquainted with the mechanical theory of heat, the kinetic theory of gases, the peculiarities of a magnetic field, and the working of an induction-balance, brilliant results of the labor of man, — and has come this evening to flash these jewels before the eyes of his motley audience.

The lecturer begins; and the listeners catch 'electricity,' 'heat,' 'sand,' 'wood.' Two close their eyes and nod (the 'regulars' have already closed their eyes and nodded). 'Energy is the power of doing work,' the lecturer