

## OHIO MINING IN 1896.

The twenty-second annual report of Mr. R. M. Haseltine, Chief Inspector of Mines of Ohio, for the year 1896 has just been filed with the Governor. From this it appears that the year's coal production of Ohio was 12,912,608 tons, a loss as compared with 1895 of 771,271 tons. The four leading counties in point of production are: Perry, 1,703,816 tons; Jackson, 1,651,109 tons; Athens, 1,383,709 tons; Hocking, 1,351,511 tons. Perry County, which has been second in point of production during the two preceding years, has again assumed the head of the list. Jackson County, which has led during the past two years, dropped back to the second position. Athens and Hocking remained third and fourth, respectively, the positions they have occupied for the past three years. Belmont County advanced from sixth to fifth, and Stark from eighth to seventh. Guernsey receded from fifth to sixth, and Jefferson from seventh to eighth. Columbiana and Tuscarawas remained as during the two preceding years. The counties of Athens, Hocking and Perry, which compose the Hocking Valley coal field, produced 4,480,086 tons, an amount which equals 34.2% of the entire production of the State as compared with 34% during the preceding year, 33.7% during 1894, 33.4% in 1893, and 37.7% during 1892.

From a carefully prepared table designed to show the amount of coal delivered at the several lake ports, it is found that it amounted in the aggregate to 8,941,327 tons in 1896. Of this 3,175,722 tons was anthracite and 5,765,605 was bituminous. By a comparison with the preceding year the latter is found to be an increase of 1,543,892 tons. The footings also indicate a gain in the total shipments of 162,093 tons over 1895, and an increase of 2,072,070 tons when compared with 1894. Of the bituminous coal sent to the lake ports during the year, 4,337,815 tons came from mines in Pennsylvania, 1,267,035 from Ohio, 159,117 from West Virginia and 1,638 from Maryland. These shipments from Pennsylvania represent a gain of 1,755,828 tons, and were equal to 75.2% of the entire year's shipment, as against 61.1% during 1895, 65.9% during 1894, and 49.9% during 1893. The Ohio fields furnished 1,267,035 tons, which is a loss of 99,679 tons as compared with the preceding year, and a loss of 801,877 tons as compared with 1894, and a loss of 861,830 tons when compared with 1893. Ohio coal during the past year formed 21.9% of the entire lake shipments of bituminous coal, as against 32.3% in 1895, 28.8% in 1894, 4% in 1893 and 25% during 1892, which indicates that during the past three years the percentage of Ohio coal in the lake shipments has decreased 24%, while the quantity from Pennsylvania has increased 25.3%.

Of the year's production of coal in Ohio, 3,868,349 tons were mined by machinery. While the year's production shows a decrease of 771,271 tons as compared with the preceding year, that produced by machinery shows an increase of 247,893. Mining machines have been operated in 11 of the 30 coal-producing counties of the State, as compared with nine during 1895. The largest production by machine was in the counties of Hocking, Athens, Perry and Guernsey. In the three former, which are known in the coal trade as the Hocking Valley, 96% of the entire amount of machine mined originated, an increase of 3% as compared with 1895. There were 13 new installations made during the past year. The new mines added to the list are: Phoenix No. 2, Courtright Kistler & Company, or No. 16, Maple Hill, Springfield and Daleton, in Athens County; Sherrods-ville No. 5, in Carroll County; New Shaft at Salineville, in Columbiana County; Central, Hartford and Trail Run, in Guernsey County; Cawthorn mine, in Hocking County; Glendale, in Perry County; Hutson No. 4, in Portage County, and the Woodland mine in Stark County. There were 45 mines in the State equipped with mining machines. In these 209 machines were operated, an increase of 45 as compared with 1895. Of this number 130, or 62.5%, were of the electric type as compared with 82 during 1895, 59 in 1894, 42 in 1893 and 27 in 1892. There were 79 machines designed to use compressed air, compared with 82 during 1895, 112 in 1894 and 107 in 1893.

There were 110 new mines opened during the year; 119 remained suspended and 114 were exhausted or abandoned. At the close of the year there were 1,203 mines in the State. Of these 1,084 were in operation a greater or less portion of the year. Of this number, 860 employed more than 10 men each and 724 employed a less number. There are 824 drift openings, 149 shafts and 66 slopes; while in 187 the mode of reclaiming the coal is not given. Of the whole number 184 are ventilated by fan, 281 by furnaces, 38 by fire-baskets and 52 by steam jets or exhaust from the pumps; 538 rely upon the laws of nature, and the mode of ventilating 179 is not given.

The number of inspections made by the members of the department was 1,835, which, when the loss of time and the adverse surroundings are considered, compares favorably with the preceding year. The number of permanent improvements is given at 280, a number which has been exceeded but twice during the history of the department. In all 93 sets of scales were tested during the year, of which 30% weighed incorrectly, as compared with 32% in 1895 and 42% in 1894. Of those found incorrect during the year five are reported as being against the miners and one against the operator. The beneficiary of the 22 remaining sets is not given.

A total of 28,447 persons found employment in and about the mines during the year. Of this number 22,145 were miners, a loss of 271 as compared with 1895, and 6,301 were day hands, of whom 3,764 were employed on the inside and 2,537 on the outside. The total number of day hands indicates a loss of 281. The statistics of labor, wages and average time of employment are very fully given in the report; a summary of its statements was given in the *Engineering and Mining Journal* for August 7th, page 154.

## IRON ORE, FIRE-CLAY AND LIMESTONE.

The iron-ore production was confined to the counties of Jackson, Lawrence and Scioto, where 70,765 tons of hematite iron ore were mined, a decrease of 22,286 tons as compared with 1895. The 17 counties which show a production of fire-clay return a total of 827,540 tons as against 844,832 tons during 1895. The average number of weeks worked is given as 32, the same as during the preceding year; 602 men were employed in mining it, which is a decrease of 227 as compared with the preceding year. In the preparation and manufacture of brick, etc., from this clay 3,189 persons were employed, as against 4,156 during 1895. In the pro-

duction of limestone the returns show losses in eight of the nine classifications into which the product is subdivided for the market. The average time worked is given as 24 weeks, a gain of one week over 1895. The number of men employed was found to be 3,186, a decrease of 643 from last year, but an increase over 1893 and 1894.

## MINE ACCIDENTS.

In all 303 accidents occurred in and around the mines of Ohio during the year. Of this number 41 were fatal, a decrease of 11 as compared with the previous year; 159 were serious, a decrease of seven, and 103 were of a minor character, an increase of 36 over last year. Of the year's accidents 44% were attributable to falls of roof, 11% to falls of coal, and 25% to injuries by mine cars. There were 814,943 tons of coal mined to each life lost; 81,211 tons for each serious injury received, and 64,563 tons produced for each person injured.

## THE COPALQUIN AND LEMON MINERAL ZONE, DURANGO, MEXICO.

Written for the Engineering and Mining Journal by Ramon Felix y Bualoa.

During an expedition lasting from July to November, 1895, through the northern part of the State of Durango, with the object in view of determining the geological formation of that region, I had an opportunity to examine closely a number of mineral zones and to fix my attention upon those which I considered of the greatest importance and future value. Of these, outside of Guanacevi, which is already well known and being rapidly developed, I will make special mention of Copalquin and Lemon, considering them, by reason of their proximity and similarity of formation, as constituting the same mineral zone. There are no extensive workings in the metal-producing zones of this district, and my conclusions are deduced from the general and comparative geology of the zone, and from its morphological characters, using the few data furnished by the workings in the veins, although they are small and have been superficial. At the close of the cretaceous period, which formation, with more or less interruptions of continuity, constitutes the skeleton of the northern portion of the State of Durango, appeared the tertiary age, characterized by colossal eruptions partly of acid rocks and principally of neutral rocks, both belonging generally to the cryptocrystalline series of these groups.

The mineral zone of Copalquin and Lemon is situated on the western slope of the Sierra Madre, between the parallels of 25° 40' and 25° 32' north latitude, being symmetrical with that of the mineral districts of Guanacevi on the eastern slope. Copalquin, which we may consider the centre of this zone, is 885 m. (2,903 ft.) above the level of the sea. Five km. (3.1 miles) to the southwest, is Lemon, at an elevation of 580 m. (1,902 ft.) and 5 km. to the northeast is found the summit of the mountain range at an elevation of 2,300 m. (7,546 ft.). In consequence the ends of the transverse axis, or line from northeast to southwest through the center of the zone, presents a difference in level of 1,720 m. (5,644 ft.).

On the barren summits of the mountains, on their slopes and in the bottoms of the ravines, we observe a large number of lodes lying in two directions, principally northwest and southeast, parallel to the general direction of the mountain range; there are also east and west lodes and dikes of green rocks crossing the general formation.

The three special cases of exploitation, moderately extensive, that have been carried on in this locality are the Refugio, San Manuel and Soledad lodes; of these the first produced a great bonanza of gold and silver, the second an extensive lode of rich silver ore, containing gold, and the last is producing abundant gold and silver ore of high-paying grades, and it has in sight a large pocket of ore rich in gold and silver, the exact dimensions of which are as yet undetermined. The topography of the zone is favorable for exploitation, exploration or investigation. In working the mines in 90% of the cases that will occur it will be a long time before it will be necessary to use hoisting or pumping machinery.

The distance to Culiacan, the capital of the State of Sinaloa on the west, is about 200 km. by the road and it is easily traveled in winter, spring and autumn, but with some slight difficulty in summer, by reason of the rains that cause freshets in the streams. In transporting ores to Culiacan to be treated it is probable that the rivers Humaya and Tamazula can be advantageously used. Culiacan is connected with the Gulf port of Altata by a railroad and at Altata various lines of steamers provide communication, either directly or with but one change, with San Francisco or Guaymas, Sonora. Communication with the interior of the Republic may be had by way of Durango, the southwestern terminus of the International Railroad, or by Guanacevi, the latter being usually preferable. By either of these routes it is necessary to traverse the Sierra Madre. The distance from Copalquin to Guanacevi is, approximately, 300 km. (186 miles). It is hoped, in view of the great development, and the importance that attaches to Guanacevi, that it will soon have a railroad; with this, and the completion of a wagon road across the Sierra Madre, the communication between Copalquin and the interior of the Republic will not be difficult.

**Platinum and Iridium in Russia.**—According to the *Bulletin de la Société de Géographie Commerciale*, xix., 5, the production of platinum in Russia in the year 1895 was nearly 270 pounds (3,735 lbs.), more than 1,750 lbs. less than during the year 1894. The output of this metal is from the Oural, in the districts of Perm and the mountain regions of Verkhoutsrski. Eleven pounds of iridium were found in the district of Orenburg, according to a recent consular report.

**Boiling Point and Critical Temperature of Liquefied Hydrogen.**—Olszewski, in the *Philosophical Magazine*, says that the constants of liquefied gases are likely in the near future to become matters of great practical import. Olszewski determined the temperatures with a platinum resistance thermometer down to -208.5°. The critical temperature (above which hydrogen is no longer liquefiable by pressure alone) was found to be -234.5° and the boiling point, at 1 atmosphere of pressure, -243.5°. Oxygen by the same resistance thermometer gave -118° to -119.2° for critical and -181.3° to -182.5° for boiling point as against -118.8° and -181.4° by the hydrogen thermometer.