these men are by far the most efficient and competent superintendents and mining bosses in the district. The water-gauge is very rarely seen around our mines. But very few know how to use it, and many do not know what it is good for, and have never seen one. The use of these scientific instruments, however, are being discussed, and I have strong hopes that the near future will bring many of them into use.

Steam Engines and Machinery.

The Delaware, Lackawanna and Western railroad company have 45 hoisting engines, of 2,038-horse power; 16 breaker engines, of 910-horse power; 34 pumping engines, of 2,553-horse power; 12 fan engines, of 600-horse power—making a total of 108 engines, with a combined horse power of 6,191. They have 194 boilers to provide steam for these engines. The Pennsylvania coal company have 32 hoisting engines, of 1,010-horse power; 7 breaker engines, of 225-horse power; 30 pumping engines, of 850-horse power; 4 fan engines, of 80-horse power—making a total of 73 engines, with a combined horse power of 2,165; and 96 boilers. The Delaware and Hudson canal company have 25 hoisting engines, of 1,211-horse power; 7 breaker engines, of 418-horse power; 17 pumping engines, of 921-horse power; 5 fan engines, of 321-horse power—making a total of 54 engines, with a combined horse power of 2,871; and 89 boilers. All the smaller companies and single operators combined have 60 hoisting engines, of 2,432-horse power; 34 breaker engines, of 1,311-horse power; 27 pumping engines, of 690-horse power; 8 fan engines, of 362-horse power—making a total of 129 engines, with a combined horse power of 4,795; and 232 boilers. This will make a grand total of 162 hoisting engines; 64 breaker engines; 108 pumping engines, and 29 fan engines—363 engines in all, having a combined horse power of 15,832; and 611 steam boilers to provide steam for them.

The supervisory care of the inspector over this vast amount of machinery with its innumerable additions of rolls, screens, cages, safety-catches, bridle chains, ropes, sheeve wheels, drums, brakes, signals, and many other things, is a fearful responsibility, and cause of inconceivable anxiety. Great care is exercised, as a rule, by all the engineers, and I am highly gratified that no accidents, excepting those that occurred through falling on screens, have happened in connection with machinery during the year. I am thoroughly convinced that all screens should be roofed over, and then it will be impossible for the slate pickers or any one else to fall upon them, as has been so often the case. The proposed covers to the screens can be put on in sections, so that they can easily be removed when the screens need repairing.

New Collieries and Openings.

Jermyn's New Shaft, Green Ridge.

The sinking of the above named new shaft was commenced by John Jermyn, Esq., on the 21st day of June, 1875, and the work of sinking was finished in six months and eleven days—that is, on the 2d day of January, 1876. The shaft is located at Green Ridge, Scranton, on a tract of land of about three hundred acres, leased by Mr. Jermyn from Messrs. Meylert & Sanderson.

Knowing that he had a difficult task on his hands, Mr. Jermyn was very careful in starting. And it was very necessary for him to be careful, for he had forty-six (46) feet of quick-sand to go through before he reached the surface of the rock. The size of the shaft is 32x17 feet, and the timber used was 12x14 inches. The timbering was done from the top. The

first four sets of timber were mortised together and firmly bolted on to the fifth set. Each set of timber was bolted thus with twelve one-inch bolts, which were four feet long, so that every fourth set of timber was bolted to the three sets above it. This frame work was forced down with two pieces of cast-iron, weighing 900 pounds each, and a frame twenty feet high was made for each of these, and they were used in the same manner as pile drivers are used, and the timber was thus forced down without any trouble. There were castings, nine inches wide, bolted under the bottom set of timber, which had a flange four inches deep, cutting its way through the sand. Buntons of 8x14 inch timber were put in every ten feet across the shaft; but when they had gone down 35 feet the pressure was so great that the timber were breaking in the centre. To remedy this, false sets of timber were put in inside of the others, leaving a space of two feet between them, which was filled with cement and small stones about the size of an apple. Four hundred barrels of the best quality of cement were used for this purpose, and it was hoped that the surface water would be thus kept out, but it was only partially successful. Buntons were put in with the inside timber every four feet, and each set was braced in the four corners of the shaft with 8x12 timber. The outside timber was hemlock and the inside was pine. The sinkers did not put in the timber. This work was done by carpenters, who framed the timber and put them in place, and who took especial care that the frame-work was kept square. The bucket was filled in a space of only four feet square. The sides and ends of the shaft were not touched, for they kept running in to the centre continually.

There were three pumps in the shaft the whole time—two of them in continual operation, and the third, an extra one, ready at all times when one of the others should need repairing; and they used a pair of small engines, with 8x10 link motion, of Dickson's manufacture. After striking the rock, and after securing the timbering, cementing, &c , the further sinking was suspended for a time for the purpose of putting in permanent boilers. Then they resumed and commenced sinking through the rock. They first went through 32 feet of hard sand stone, and then met with a seam of coal four feet six inches thick, with six inches of slate in it. The coal is of a very poor quality and will not be worked for many years. Then they went through 14 feet of slate rock and met with another seam of coal, of very good quality, six feet and six inches thick, with four inches of slate intermixed. Below this they had 45 feet of tough slate rock, and then struck a nine-feet seam of coal of excellent quality, with only three inches of bone in the whole thickness. A sump was made in this coal for the water. Then they sank through 40 feet of very hard rock, upon which drills would make no impression. It was very slow work sinking through this, but perseverance overcame even this, and still another seam of coal, six feet thick, was met with, but this seam has slate all intermixed, making it utterly unmarketable—in the present condition of the trade, at least. Next they had 40½ feet of slate rock, and met a three-feet seam of very good coal; then 40 feet of hard rock, which worked very well, and then met six feet six inches of coal of very good quality, with a foot of fire clay near the bottom. This seam was struck on a saddle, and as they worked in some distance the fire-clay seemed to be thinning out, but as there was considerable gas evolving, and as they had no fan as yet, they did not enter very far. They made a sump here and then stopped sinking. The distance from the surface of the rock to the bottom is 255 feet. The sinking through the rock was done entirely with Rend Rock powder, which was fired with a battery, and not the least accident happened to any one from beginning to end.

Second Opening.—The second opening is 100 yards from the main shaft, and is also a shaft 10x15 feet in the clear. They had 55 feet of quicksand to sink through in this shaft, and the work was done in the same manner as in the main shaft, but they did not sink so fast. They have a pair of 14x 30 link motion engines, with compound brakes, at this shaft. No coal is hoisted—only the workmen and materials for the use of the inside workings. There are two of the largest size steam pumps, of Guild & Garrison's make, of Williamsburg, N. Y., put in here, and one of them is more than sufficient to take out the water. These pumps give entire satisfaction, and only cost $1,450 each, and the expense of putting them in is very trifling.

The Breaker.—The breaker is a mammoth concern. It is located in a hollow, and for that reason they were obliged to build it very high so as to insure fall enough for their chutes to the railroad. About a million feet of lumber was used in its construction, and the greater part of it is pine, shipped from Williamsport. It has two sets of rolls and six screens, and can make all sizes of coal, or run it all into stove, chestnut and pea coal, according to the demands of the market; and the breaker has a capacity of 800 to 1,000 tons per day.

Outside Improvements.—They have a fan of twenty feet diameter and five feet face, which is driven by an 18x22 link motion 80-horse power engine, and it is run at about fifty revolutions per minute, giving all the ventilation that can be desired. The fan house is built of brick. They have four hoisting engines, 220-horse power, and a 60-horse power breaker engine. The boiler house is built of brick and contains 12 boilers. There is also a machine shop connected with the works, in which there is a 15-horse power engine, which runs a lathe, bolt cutter, the saws in the carpenter shops and a fan for blast in the blacksmith shop. The carpenter shop is large and commodious, and is fitted up with circular and rip saws, and all the modern improvements for dispatching work. The blacksmith shop is also of the first class.

NOTE.—The time consumed to sink through the 46 feet of quicksand in the main shaft was just five weeks; the time required to go through the rock, a distance of 255 feet, including the coal seams, was six months and eleven days; the time in which all this work was done—sinking the two shafts, building the breaker, boiler house, engine house, fan house, shops, office, and the whole thing complete—was just eleven months and two days. John Jermyn, Esq, deserves great credit for the untiring energy he has displayed and the enterprise he has manifested in undertaking and successfully accomplishing this great task, which he did on his own individual responsibility. And this must be my excuse, if any is needed, for this extended notice of his colliery.

No. 13 Shaft.

This shaft was sunk by the Pennsylvania coal company—the sinking being almost all done during 1876. It is located in Lackawanna township, near Moosic. It is 31 feet 6 inches long by 12 feet wide, and about 137 feet deep, from the top of the cribbing to the bottom of the coal seam. The coal is raised 65 feet above the top of the cribbing, making the full depth of the shaft about 202 feet. They have no second opening to this shaft, but expect to make a connection with the Law shaft as soon as possible. No coal was shipped from here during the year.

Jones & Simpson's Slope.

This is new slope, located at Archbald, and owned by Jones, Simpson & Co. The area of the slope is 6x10 feet, and its length is 547 feet. The