

part, at least, of the current to take the short and most natural road through door B into air-way No. 4 instead of around the face of the mine, which reduced the quantity travelling in that direction, how much no one is supposed to know. The reason Mr. Nicholls gave for having but a single door on the gangway at B to protect the current at this point was, "that the mine or gangway at this point had been driven, most part of it, through a rock fault, in some places no coal at all, other parts had thin coal as shown on plan, but that they were then endeavoring to connect chamber E with workings on top of plane F, in order to correct this matter, and had been doing all they could to improve the condition of the place ever since the L. C. and I. Co. got possession, and that they had also opened the new air-way from door A inward, so as to avoid the necessity of having the return air on the main gangway, which they thought to have connected to a chamber marked H, which was being driven parallel with the gangway from air-way No. 4 inward, so as to make it a complete return."

Up to the time of the explosion this mine had been very badly arranged. It is true that the faults, &c., made it difficult, nevertheless, the general plan of the mine and the manner in which it was being worked were wrong in principle.

I entered my protest against the manner of ventilation each time I visited the mine, although I did not find standing gas therein but once. I condemned it to Mr. Jas. Thomas, superintendent in charge, and to Mr. John Nichols, the mine boss, for I have always opposed the idea of coursing the air-current first through the chambers, even when there are parallel air-ways with the gangways, but still more so when a mine has no such air-ways, and where the main gangway is made the return for the smoke and foul of the mine. If an explosion or fire takes place, the after-damp and gases are met in the main gangway, the very place where the pure air is required the most, to keep the fresh men in good condition and to recussitate those that may be affected by said gases.

This had in contemplation a new fan, 18 feet in diameter, to be placed at the new shaft at X on plan, but it was not quite ready. There was a small propulsion fan at the hoisting shaft that had been in use, but had been abandoned, leaving the whole hoisting shaft to be an up-cast and the new shaft to be the down-cast.

The following was the air report for December, 1871, (the mine was not working in January:) Amount at face of mine, 12,500 cubic feet of air per minute; amount at outlet, 18,000 cubic feet of air per minute. I must say that this company were endeavoring to improve matters from the time they took possession.

In regard to the matter of fire-boss, had there been one, as the law especially provides for, it is more than likely that the sad catastrophe would not have occurred. That it was one of many serious accidents that have occurred in our coal mines from the effect of bad management, including loose discipline and a want of proper respect for the ventilation law, few will deny.

Since the accident the new fan has been put up, and was built by Mr. Snyder, Pottsville, and gives the following result: Fan dimensions, 18 feet in diameter, 6 feet wide, centre opening 9 feet in diameter. Upright engine, first motion, cylinder, 18 inches diameter; stroke, 2 feet. When fan is running 58 revolutions it gives about 58,000 cubic feet per minute. Number of persons employed at present, 72.

F. Mercur, general superintendent; Jenkin B. Jones, mining boss at present.

Prospect shaft.—This shaft is located east of Wilkesbarre, between the back road and the plank road. It is 600 feet deep and sunk into the Baltimore bed. No coal has or can be sent from this mine for some time, the breaker not being quite ready; and the shaft having been newly sunk, will take some time to have the mine properly opened. Mr. Mercur showed me the plan on which he purposes to have the same opened, which, should it be carried out, will undoubtedly prove a good one.

This mine generates some fire-damp. There appears to be ample provision made to ventilate the same, as there is a fan 20 feet in diameter put up there of Mr. Weightman's design, and built by Snyder, Pottsville, Pa.

The fan is put up in the most substantial manner, and is being driven by an upright engine, first motion, 18-inch cylinder. The engine house is built of stone, not a stick of timber, except what sustains the roof, to be seen in the building. The fan house adjoining is built nearly in the same manner. The fan is enclosed on the sides with stone and brick, the periphery with cast iron plates, and a sheet iron stack 15 feet high. The head house of the shaft is composed of a few pieces of timber, braced and bolted together in a simple yet substantial manner, with an iron ladder firmly and permanently placed to ascend the same for the purpose

of oiling the sheaves, around which there is an iron railing around the top of the frame where it is necessary for any person to travel. It has no roof of any kind. The breaker is being built several hundred feet away from the shaft.

The hoisting is being done by a pair of first motion engines of Snyder's, Pottsville, Pa., make. The cylinders of which are 24 inches diameter, 6 feet stroke. The drum is of cast iron, with grooves on it for the wire rope, which is 8 feet diameter in centre, and 12 feet at each end. There is a very powerful brake attached to the drum, the handle of which is conveniently placed to the engineer. This brake has already been found to be very useful and has been well tested; on one occasion the engineer found that he had no control of his engine while hoisting, there being something the matter with the valve, he immediately applied his brakes, and stopped the engine until he had his engine again in order.

Oak Wood shaft.—This is a new shaft, a second opening, that is being sunk about half a mile or more east of the present shaft, which is down now about 40 feet. It has about 700 feet to go to reach the coal it is so stated. F. Mercur, general superintendent; John Nicholls, mining boss.

Exeter shaft.—This shaft is located a short distance west of the West Pittston old shaft, and is being sunk for a second opening for the same. It is down at present about 150 feet, or about half way down to the coal. F. Mercur, general superintendent.

MALTBY'S SHAFT.

This shaft is a new one, and is located a short distance below Wyoming town, near the turnpike road leading from Kingston to Pittston. It was begun in 1871, remained idle through the winter, and work resumed again in the spring of 1872; but it has since been abandoned for the present. This is a circular shaft 20 feet in diameter, built of a brick wall 22 inches thick, set in cement, and coated with a heavy coat of cement on the outside, making a smooth surface to it, so that it may easier pass downward through the sand and gravel. The wall aforementioned is firmly bolted together by a number of wrought-iron rods that are placed in the centre of the wall, and each 13 feet in length, at which distance a cast-iron plate — inches thick is placed in the wall around the whole shaft, it being cast in segments. Each of the rods are fastened through the cast-iron plate, and a distance of 3 or 4 inches is left between the ends of the rods of the adjoining sections. The brick work is built in layers of 6 or 8 feet at a time, which is being done above the surface, the weight of the wall, &c., pressing it down into the sand or loose ground below, as the same was being hoisted by bucket or otherwise.

There was a difficulty experienced in connection with the wall. When they had built about 70 feet of it it was found to be giving way. In the lower part a breach was discovered in the wall, being broken and apart several inches, which occurred by the breaking and crumbling of the cast-iron plates, caused probably by the manner in which the rods were placed through the cast-iron plates, the whole weight being thrown upon that part of the plate between the top end of one rod and the bottom end of the other, together with the enormous side-pressure due from quicksand and water. The rock at this point is 160 feet below the surface; hence it is quite an hazardous undertaking in the manner proposed. It is now contemplated to start and build another wall inside the present, and continue it until the rock is reached; also, to commence a second shaft at a distance to make it a lawful second opening for the former. The latter proposed shaft may be sunk much easier than the former, the ground being sandy; consequently the sinking of the first will lessen the quantity of water to be contended with in the second. The whole work done has been under the supervision of Mr. O. C. Fowler, general superintendent for S. C. Maltby, Esq., proprietor.

Maltby old mines.—These mines consist of the Maltby old shaft and a water level drift. The old shaft is located a short distance north of the new shaft, near the back road. It was abandoned by S. C. Maltby in 1870. Since that time Wilner & Co. leased the small vein above water level in the shaft, and have subsequently opened a drift on the mountain side, on the same vein that was being worked in the shaft in 1870, and is supposed to be the vein next overlying the Pittston big vein. In the drift very little work has been done. There are a few chambers opened on each, some of which are worked up and through into an old drift higher up on the mountain side.

CONSUMER'S COAL COMPANY'S SHAFT, KINGSTON, PA.

East Boston Shaft.—No. 1 carriage dropped, first trial, $13\frac{3}{4}$ inches; second trial, 6 inches; third trial, $9\frac{1}{2}$ inches. No. 2 carriage not used for hoisting or lowering persons.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY'S SHAFTS.

Avondale Shaft.—No. 1 carriage dropped, first trial, 2 inches; second trial, $1\frac{3}{4}$ inches; third trial, $1\frac{3}{4}$ inches. No. 2 carriage dropped, first trial, $1\frac{1}{2}$ inches; second trial, $1\frac{1}{2}$ inches; third trial, $1\frac{1}{2}$ inches.

Boston Shaft.—No. 1 carriage dropped, first trial, $1\frac{1}{2}$ inches; second trial, $1\frac{1}{4}$ inches; third trial, $1\frac{1}{2}$ inches. No. 2 carriage dropped, first trial, $1\frac{1}{2}$ inches; second trial, $1\frac{1}{2}$ inches.

RIVERSIDE COAL COMPANY'S SHAFT, PLAINSVILLE, PA.

Enterprise Shaft.—No. 1 carriage dropped, first trial, 4 inches; second trial, $\frac{3}{4}$ inch. No. 2 carriage not used for hoisting or lowering persons.

LUZERNE COAL AND IRON COMPANY'S SHAFTS, PLAINSVILLE, PA.

Henry Shaft.—No. 1 carriage dropped, first trial, 2 inches; second trial, 2 inches. No. 2 carriage not used for hoisting or lowering persons.

Prospect Shaft.—No. 1 carriage dropped, first trial, 2 inches; second trial, 2 inches; third trial, 2 inches. No. 2 carriage not used for hoisting or lowering persons.

DELAWARE AND HUDSON CANAL COMPANY'S SHAFTS.

Pine Ridge Shaft.—No. 1 carriage dropped, first trial, 2 inches; second trial, 2 inches; third trial, 2 inches. No. 2 carriage dropped, first trial, 2 inches; second trial, 2 inches; third trial, 2 inches.

Conyngnam Shaft.—No. 1 carriage dropped, first trial, 12 inches; second trial, 14 inches; third trial, 8 inches. No. 2 carriage not used for lowering or hoisting persons.

NORTHERN COAL AND IRON COMPANY'S SHAFTS, PLYMOUTH, PA.

No. 1 Shaft.—No. 1 carriage dropped, first trial, 2 inches; second trial, 2 inches. No. 2 carriage dropped, first trial, 2 inches; second trial, 2 inches.

No. 2 Shaft.—No. 1 carriage dropped, first trial, 3 inches; second trial, 2 inches. No. 2 carriage dropped, first trial, 3 inches; second trial, 2 inches.

No. 3 Shaft.—No. 1 carriage dropped, first trial, 3 inches; second trial, 2 inches. No. 2 carriage not used for hoisting or lowering persons.

No. 4 Shaft.—No. 1 carriage dropped, first trial, 6 inches; second trial, $2\frac{1}{2}$ inches. No. 2 carriage dropped, first trial, 6 inches; second trial, $2\frac{1}{2}$ inches.

WILKES BARRE COAL AND IRON COMPANY'S SHAFTS.

Dodson Shaft.—No. 1 carriage dropped, first trial, 6 inches; second trial, 6 inches; third trial, 6 inches. No. 2 carriage dropped, first trial, 6 inches; second trial, 6 inches; third trial, 6 inches.

Lance Shaft.—No. 1 carriage dropped, first trial, 5 inches; second trial, 4 inches; third trial, 6 inches. No. 2 carriage dropped, first trial, 6 inches; second trial, 6 inches; third trial, 6 inches.

NEW SHAFTS NOT YET COMPLETED.

Wilkes Barre Coal and Iron Company's, No. 14, shaft near Gaylord slope, Plymouth, Pa. This is a large shaft and is intended to work the Red Ash seam, and to be connected to the Nottingham shaft where the seam is being worked.

Hollenback Shaft is located within Wilkes Barre city limits, a short distance east of Market street, near the P. R. R. This shaft will penetrate the Baltimore seam, in the early part of 1874.

South Wilkes Barre Shaft.—This shaft is intended to win the coal of the Baltimore seam, which is thought to lie at a depth of about 500 or 600 feet. It is also intended to commence a second shaft at a distance of 150 or 200 feet west of the present shaft for a second opening to the former.

Audenried Shaft.—This shaft, although the sinking has been completed, will not be ready to hoist coals for some time to come, as it needs timbering and lining beside, that there is no coal breaker yet ready. This shaft is the deepest in the Wyoming valley—the Dundee not excepted—the latter being 810 feet and the former being 892 feet. The plan of the proposed breaker indicates that the coal will be hoisted over one hundred feet above the pit mouth, making a total hoist of over 1,000 feet; the hoisting to be done with first motion engines.

Riverside Coal Company's New Shaft, near Port Bowkley slope, Plainsville.—This shaft was commenced in 1872, but operations since suspended have just been again resumed. It is now in contemplation to continue sinking until it reaches the Baltimore seam, which lies at a depth of several hundred feet below the surface at this point.

Susquehanna Coal Company's Shaft, at East Nanticoke.—Shaft No. 1 is located a short distance south of the village of Nanticoke, and alongside that branch of the Susquehanna railroad connecting Nanticoke, New Port and Wilkes Barre. The said shaft is 42 feet 4 inches by 13 feet 4 inches, to be divided into suitable compartments. It is calculated that this shaft will cut the Baltimore seam at the depth of about 700 feet, and then to continue one part of said shaft still downward until the Red Ash is reached, getting a second opening for the Baltimore seam by connecting with No. 2 slope, and for the lower seam by driving up to No. 1 tunnel workings.

No. 2 Shaft.—This shaft is located a few hundred yards north of the old mill, and close to the pond connecting with the water of the Nanticoke dam. Some dredging has been done, no doubt preparatory to bringing in their canal boats to this point. It is intended that this shaft also be sunk to the Red Ash seam, but it will not require so deep a shaft at the point where No. 2 is located as it will where No. 1 is located, as some of the overlying strata at the latter place is missing at the location of the former.

Luzerne Coal and Iron Company's Oakwood Shaft.—This shaft is intended to be a second opening for the **Prospect** shaft, and is down at present about 300 feet; will probably reach the Baltimore seam in 400 feet more, or a total depth of 700 feet.

Northern Coal and Iron Company's New Shaft, near No. 3 Shaft.—This shaft is intended to serve for a second opening for No. 3 shaft, and may be completed during 1874.

OLD SHAFTS BEING SUNK DEEPER.

Northern Coal Company's No. 4 Shaft, Swetland.—The company is having things prepared for the purpose of sinking this shaft from their Bennet or Baltimore lower bed to the Red Ash seam, a distance probably of about 300 feet or over.

Some time in August the company's officials, not feeling quite satisfied with the result of their experiments, thought proper to apply the same method as that adopted by the Lehigh and Wilkesbarre Coal Company at the Empire fire. The closing of every hole and crevice connected with the fire was at once ordered, and in a short time the application of steam was commenced. The thin covering overlying the coal seam at this point gave much trouble, as the roof was caving in at different points daily, for some length of time, thereby allowing the steam and gases to escape to the surface.

The surface having dropped some 10 or 12 feet vertical during the cave, it was so shattered that it was almost impossible to seal up very close a large area of such broken surface, as many of the crevices could not be detected unless by escaping of the steam.

The crevices at the surface show that the carbonic gas generated below escapes with the steam, and in consequence does not fill up inside the enclosure.

It is stated by the officials in charge, that there is no carbonic acid gas to be found lodged at the lower part of the enclosure.

I would here state that the seam at this point does not pitch more than about 15° or 17° on an average. Up to the time of writing this report the fire has not been extinguished.

It is difficult to think how it can be, that if the whole enclosure inside, around the fire, is air tight, or nearly so, that there is no accumulation of carbonic acid gas, notwithstanding that there are some crevices leaking to the surface; but if there are very many of these crevices leaking, and that the steam and gases can be detected escaping in large quantities, then it is very reasonable to suppose that there must be a considerable quantity of atmospheric air entering at some of the lower points of the enclosure. The current formed from the admittance of said air carries with it the heavy gases towards the escape on the surface. In this way the specific gravity of those gases are overcome. How the amount of air necessary to form these currents is admitted is not for me to say; but it is questionable with me, whether a bank of sand, filled or packed into an excavated place on even so light a pitch as 15° can be put in tight enough, and remain so, to keep out a heavy pressure of air, as the same continually settles down. Again, no matter at what point the air is admitted, its specific gravity causes it first to fall to the lowest point, and (as it becomes heated) presses out a similar volume of lighter air at a higher point, that quantity also increasing in volume at a certain rate, as the same is heated, and displacing other air in the same ratio, continuing thus until an equilibrium is found or no air admitted.

The steam used is being generated by the use of thirty-one steam boilers, located at the north end and west side.

The officers in charge of these operations are Messrs. E. W. Weston and A. H. Vandling, general superintendents; Christian Scharar, mining engineer and superintendent; Wm. W. Reese, mining foreman; Ed. Hahn, mining boss; Wm. L. Foot, outside foreman, and Ed. Macken, outside boss.

PROSPECT SHAFT COLLIERY FIRE.

The fire in the Prospect Shaft colliery began on the 24th day of January, 1874. This colliery was comparatively a new one, and not having had its second opening, there were but a few persons working there, and most of them driving in the direction of the proposed second opening.

On the above day, a blast was fired in one of the gangways, from which the gas ignited as on many other occasions, setting the whole face in one sheet of flame or fire.

The mining boss and his fire bosses, with the gangway and air-way men were at once engaged in endeavoring to extinguish the flames with buckets, kegs, &c. The water used had to be hauled into the gangway from the foot of the shaft, except the first few barrels usually kept filled and ready to be used. The fire soon showed that something more must be done to stay its work of destruction. The Babcock fire extinguishers were then tried, still the fire was gaining ground and consuming every thing that was in its way, such as brattices, wooden stoppings, doors and timber.

The men becoming exhausted, they sent to the surface for more aid. A messenger was dispatched to the city of Wilkesbarre, to procure hose from the fire department.

In the meantime the fire had ran back through the upper gangway, nearly five hundred feet from the face, the men still fighting it on their retreat as best they could; they fought it in one place until the second built brattices and doors were burned down, and by their desperate resistance they were only saved. As the fire had, by this time, unawares to them, passed back by them through the return air-way along the anticlinal, like a snake in the grass, and had almost reached the shaft, when the flames were observed through a door, west of the No. 1 north tunnel, leading into the main return connecting directly with the upcast shaft.

The fan being located a short distance from the shaft head on the north side of the upcast, and probably the wind blowing in the direction of the shaft, the dense clouds of wood smoke that were being exhausted by the fan, began to descend the shaft in the intake air.

About twelve o'clock, midnight, no hose having arrived, and the fire gaining headway with such rapidity, it was decided to withdraw the men from the workings immediately, and proceed to fill up the shaft and workings with water.

The mine was an unusually dry one, notwithstanding that the shaft was 600 feet deep. All the water it made was hoisted in a water car, and that used only occasionally.

The first thing done, was the letting into the mine water from the large reservoir, belonging to the mine, and at the same time start their pump at the river to keep up a supply.

Some of the officers thought it would be well to prevent some of the great draught of fresh air from entering the shaft, and endeavored to close up the same; but when a temporary cover had been put over the shaft surface, a powerful explosion took place, blowing the cover into hundreds of small fragments in every direction. Luckily, there was no one hurt by the concussion.

The closing up of the shaft surface was at once abandoned, although explosion after explosion followed each other, but each seemed to have less force, until finally they ceased altogether.

In course of time two other steam pumps were had and placed in position, one on the south side of the shaft, near the canal side, and the other on the north side, near the river side. Each of the three pumps had about 200 feet vertical height to lift their water to the shaft head.

The filling up of the mine required about six days, to close the gangway to the roof, at the foot of the shaft, thereby shutting off the draught; and in ten days it had risen one hundred and thirty (130) feet in the shaft.

The water was afterwards let stand for a short time. After a time, being fully satisfied that the water had been high enough in the shaft to cover the

highest point in the said mine—a sharp anticlinal axis between the north and south gangways—it was thought proper and safe to commence leisurely to hoist the water out of the shaft again, and the roof of the gangways was again in sight March 9.

When the writer was there, March 16, the air was still very warm, escaping out of the mine, and the carburetted hydrogen gas was being pressed out in solid volumes; hence we could not penetrate the working any further than the foot of the shaft at that time. May 21 I again visited this mine, when Mr. William Samuel, the mining boss, accompanied me through the same, so far as we were able to go with safety. We found a good part of the main gangways free from gas, although each other part was full.

There were but a few men working in the mine at the time, who were employed then in reopening the return air-way from No. 1, north tunnel, west towards the upcast shaft.

No lamp was permitted to be used in the mine except safety lamps, and I must say that it is dangerous, unpleasant and difficult enough to work in the many intricate passages of a coal mine even when light is obtained from the miners' usual necked lamp; but the dangers, unpleasantness and difficulties must be much increased when, being compelled by any circumstances to work by the dim light given by a safety lamp, whose wire gauze meshes are so fine and close that there are no less than 728 of them in one square inch, and yet, as small as said light might be, even that could not be had, to do the work on the advance, in the aforementioned return air-way.

We finally came to a place where all the lamps were stationed, with one man in charge of the same. After giving up our lamps to the man in charge of the workmen's lamps, we advanced cautiously in the midst of darkness for quite a distance towards the shaft under the direction of our guide, the mining boss, who, by the way, seemed to be so familiar with this mole passage, that a person would almost suspect him of having a necked lamp or light with him during all this time.

We passed three individuals working in this dark and dismal passage before reaching the face of the works of re-opening.

This air-way had been closed from the effects of the fire; the seam lying at an angle of 70 or 80 degrees at this point, the coals were free and of a slippery nature, and the timber support having been consumed caused it to cave in, falling to a height of about 25 feet or more. The new opening had to be made at the highest point through this fallen material of coal, slate and rock.

There was a small quantity of air screening through this caved in air-way, but not enough to dilute the enormous quantity of gas given off in this mine, hence it was that safety lamps could not be used where those men were then working, the same being full of explosive gases.

The thought could not have been a very agreeable one to meditate over; that the striking and lighting of a single lucifer match anywhere in the mine at that time, except at a few points along the main gangway, would have been sufficient to ignite the whole explosive contents of the said magazine, composed of thousands of cubic feet of the most powerful explosive substance, whereby each human being within its jaws would be instantaneously hurled into eternity.

This state of things, bad as they were, were at the time unavoidable. The above merely shows a faint picture of the many dangers that are encountered by the men whose fortune it is to delve in the bowels of the earth in order to gain for themselves and those dependent upon them the means of living.

I visited this mine again July 28th, when I met Mr. Samuel, the mining boss, and on examination found that the standing gas had all been removed and the driving of the gangways towards the proposed second opening had been again resumed.

On November 20th I had occasion again to visit this mine, and did not find any standing gas in any part of the same, except a small quantity in a narrow passage being driven up towards the summit of an anticlinal axis, where, two days previous, a miner named Savage, had been suffocated through the inhalation of a quantity of said gas.

In examining the north side there we met three parties at work, in driving air-ways and a gangway, and about 30,000 cubic feet of air per minute entering the said gangway. It was measured about five hundred feet back from the face. At or near the face there was a cross-hole—usually called by miners cross-cut or heading—being driven at right angles with the gangway to break through into its parallel air-way.

There was about thirty feet between said cross-hole being driven, and the one last made outside of it, through which there was about 27,000 cubic feet of air per minute passing at the time.

A few feet outside of this last mentioned cross-hole there was placed a check door across the gangway road, and a wooden brattice was built from it in towards the face, with a space between it and the rib or side of four or five feet and carried to within a few feet of the gangway face. This brattice and door forced about eighteen thousand cubic feet of air per minute sweeping around the face, for all that no necked lamps could be used in the face, the men were actually suffering from the effects of so large a quantity of air passing through so small a space, thereby causing such a strong current, with the thermometer down to 33° Fahrenheit or nearly to the freezing point, at the face of the gangway.

On examining the condition of the air in the return air-way, at a point nearly opposite where we measured the intake air, we found about thirty thousand cubic feet of air passing, and so loaded with gas that it would not be safe to risk a necked lamp near it.

It will be remembered that there were but three parties working in this current at the time, but, for all that, the quantity above mentioned was almost to the explosive point, showing that this part of the mine alone generated the fearful amount of nearly two thousand cubic feet of carburated hydrogen gas per minute. On examining the south side gangway, there were found 21,000 cubic feet of air per minute passing through the inside cross-cut between the air-way and the gangway.

Another matter in connection with the history of this colliery, worthy of note, is this, that not a single life has been lost in it, directly through the explosion of gas, up to December 31, 1874, although there have been some narrow escapes.

I here give one more incident to show to the outside world what the men in charge of this mine have had to contend against. One day, in the fall of the year, there happened to be no work, and the engineer, knowing that there was no person in the mine, stopped his fan for the purpose of examining the condition of its machinery and to overhaul any part requiring it, while there was time to do so without hindrance to the work. In about four hours afterward he had occasion to enter the return air-way, leading from the head of the upcast shaft into the fan, and he thought to himself, "perhaps I would better take a safety lamp instead of a necked lamp." Luckily for him, he did so. As he was approaching the side door into the said air-way he saw the door open, there being no pressure from without on it, and, all at once, when within four feet of the entrance, he detected

the gas exploding in his lamp, at such a force was it being pressed up out of the mine by the atmospheric pressure alone.

It is hardly necessary to say that, had it not been for the presence of mind or forethought of the engineer on that occasion, there would have been a fearful explosion, resulting in much damage to property, and more than that, in all probability in loss of at least one human life.

Ever since the resumption of work after the great fire a gas pipe, two and a half inches in diameter, has been laid from the foot of the shaft, along the main gangway, to the face, with places to make connections on the same at regular intervals. The same is connected to a column pipe in the shaft, which is fed from the reservoir on the surface. In this manner they are able to combat the gas fires very successfully as yet, although they have had some hard trials, even with this means at their command.

The officers of the company in charge of this mine at the time of the great fire were as follows: Frederick Mercur, general superintendent; Colonel A. G. Masson, assistant superintendent; William Patten, master machinist; James A. Bryden, mining foreman, and William Samuel, mining boss; all of whom are entitled to much credit for their very successful management of so difficult a place; and they must have had many good and trustworthy aids and assistants in their fire bosses and other men in charge of the different departments and shifts, who are also worthy of commendation.

COAL MINED AND SENT TO MARKET IN 1874.

The quantity sent to market, as per reports received, was 4,200,000 tons exclusive of whatever quantity that was mined and consumed at the mines in various ways, such as by all the mine furnaces, mine locomotives, stationary engine boilers and the sales for company and other houses. Add to this 7.5 for home consumption, which is less than one-half the amount by some statistics published, making a total of coal mined 4,513,847 tons.

CASUALTIES.

There were fifty-seven lives lost in this district during the year 1874, besides one hundred and five persons seriously injured, leaving twenty-nine widows and sixty-nine orphans.

RECAPITULATION.

	Killed.	Injured.
<i>Inside :—</i>		
Falls of materials—coal, bone, timber, slate and rock.	17	25
Crushed by hoisting carriages	2	0
Gas—explosions of	9	32
Blasts in coal.	4	6
Mine cars—run over by	9	14
Wire rope breaking and letting bucket down shaft	0	1
Blasting barrel, explosion of, by cleaning	0	1
Fell down shafts	3	3
Blasts in rock.	0	3
Powder—burned by explosion of.	1	9
Putting of locomotive engine on track and crushed by mule,	0	2
Fell down slope.	0	1
Fell through hoisting carriage platform	0	1
Scalded by steam from boiler	1	0.

14 MINE REPORT.

Prospect Shaft, L. V. C. Co.—This mine has had a second opening by connecting with the Oakwood shaft just sank, which is intended to give a lawful second opening and an additional means for ventilating Prospect shaft, besides that it will be used as a separate and independent hoisting shaft. Depth, 600 feet, nearly.

D. & H. C. Co.'s No. 4 Shaft, Plymouth Mines.—This shaft, having been sank from the Baltimore to the Red Ash seam, required a second opening, which was effected through sinking a new shaft west of the hoisting shaft, at the proper distance. The said new shaft is intended to be used for pumping and ventilation.

SHAFTS AT PRESENT WITHOUT SECOND OPENINGS.

- D. & H. C. Co.'s No. 3 Shaft, near Plymouth.*
- L. & W. B. C. Co.'s Hollenback Shaft, located in the city.*
- S. C. Co.'s Nos. 1 and 2 Shafts, East Nanticoke.*

BALTIMORE MINES FIRE.

The fire in the mines above named, which was described in my report for 1874, has not yet been extinguished, although confined within the barricade made of earth and clay, except that occasionally it breaks out, besides that the roof or covering, which is so thin and broken, falls in once in awhile. The force of persons that was required is now reduced to a very few men.

The steam from the boilers, mentioned in my last report as being forced into the fire, has been discontinued for some time.

EMPIRE FIRE.

It is not definitely known whether the fire in the above named mine, which was also described in my last report, is still burning or not. When last that the enclosure was penetrated the heat was so great in some parts, near the surface or crop of the seam, that it was considered advisable to close it up again, although it causes no other inconveniences than the expense of keeping a man or two to watch for fear of surface caves, which they had to guard against from the breaking out of the fire.

The coal that would have been brought to the shaft, being hoisted through No. 5 slope, has been done just as successfully through the new opening made west of the tunnel into No. 4 slope workings, and mining carried on just as extensive as prior to the fire.

STEAM BOILERS UNDER GROUND.

Nearly all the steam boilers located under ground in this district have, within the last few years, taken them out, and especially so since the great fires in the Empire and Baltimore mines. The boilers of Nos. 4 and 5 slopes, at the Empire mines, have been taken out, and a bore-hole 9 inches in diameter was put down with a diamond drill at No. 4, through which steam pipes were taken from boilers on the surface, and steam is conveyed from the surface to the No. 5 engines, the pipes being about fifteen hundred feet in length.

At Sugar Notch a hole has been put down preparatory to taking out boilers from said mine.

Franklin Coal Co.'s Old Slope.—The steam boilers that they have had inside of their mines for many years have this year been taken out.

Jersey Mine.—The steam boilers, located near the head of their inside slope, have been taken out about two or three years ago.

been lowered to a depth of about one hundred and forty feet, and the superintendent stated that they had about fourteen feet more to go before striking the solid rock. Subsequently I have been informed that the whole operation has been suspended for some time.

Second Opening.—The following shafts at present have no lawful second opening: Nos. 1 and 2, Susquehanna coal company, at East Nanticoke; Conyngham shaft, Delaware and Hudson coal company, near Wilkesbarre; Ellenwood shaft, Ellenwood coal company, near Kingston. The respective parties are driving for the second opening in each case, except the latter; operations in the same having been suspended since 1875.

MINES ON FIRE.

The Empire mine fire is not extinguished altogether yet. Although it causes but very little inconvenience or expense as at present. Whatever amount of fire that there is in the said old mines is located very near the crop of the seam. The same being above water level is hard to overcome in any manner, as the periphery of so large an area is almost impossible to be made perfectly air tight; hence a certain amount of fresh fuel is added to the fire, no doubt continually. The inclosed space having been opened at the lower level several times, the carbonic acid gas has been drained from the higher point, and to get another fresh supply sufficient to fill the whole space, the same being manufactured by the slow process of the consumption of oxygen by the present fire is almost out of the question.

The Baltimore Old Mine Fire.—This old mine is still burning. It is confined to the boundaries, as described in my last report, and requires but a few persons to attend to the same.

Prospect Shaft Fire.—The Prospect shaft colliery was again visited by the ravages of a fire during the year of a very severe character.

On the — day of January, at about 8 P. M., a blast was fired in the face of the north-west gangway, from which the gas ignited around the face. The men began to combat the fire, but by some mishap one of the water connections would not work, hence they could not employ their hose and force of water upon which they depended. Before they got the same changed and in order to work, requiring perhaps three-quarters of an hour, the fire had gained such headway that they were unable to cope with it. The fire had crept back opposite them through the airway or return, they being in the intake. In the combat the boss, Samuels and two of his men were more or less burned on their faces and hands, but not seriously, but before twelve o'clock midnight they were all compelled to abandon their efforts and retreat to the surface, after which the water from the reservoir was turned in to flood the mine. They had a two and a-half inch gas pipe from the shaft's foot to the face of the gangway, connected immediately with the reservoir on the surface, thus having a head of six hundred (600) feet. This appliance had been kept in readiness and often successfully employed since the great fire of 1874. The operation of flooding the mine by letting in the water from the large reservoir near the shaft's head, and pumping from the river and canal, sufficient to prevent the admittance of atmospheric air, took several days. After that the water had reached a height of about one hundred (100) feet, or sixty (60) feet above the highest point excavated in the workings—pumping water into the shaft was discontinued. Having given ample time for cooling the strata, the hoisting of water from the mine was now commenced. Some of the chambers on the pitch had been worked up quite a ways, having reached perhaps, in some cases, as high as forty feet vertical above the shaft gangway.

On the seventh of March they had reached or got the water out to within about forty (40) feet of the shaft's bottom.

At this time they noticed that the gas was escaping very fast, judging from its noise in the shaft, and in consequence orders were immediately given by the boss in charge, Mr. Wm. Patten, not to let any naked lamp or fire be brought near the shaft head. About nine o'clock P. M. Jacob Glotz was on duty as headman, with nothing to do but to see that no person violated the orders above mentioned, and that nothing might go wrong unnoticed with the water tanks, as they were provided with a trip so that they emptied their contents automatically. The night watchman, Charles Nolan, came along with his lantern upon his arm, and Glotz, the headman, stated that he hailed the watchman, and told him to stand away with his lantern. Just at the time a tank or bucket of water was being landed, and at once the gas was ignited from the watchman's lantern. An explosion followed, from which both the men were severely burned on their faces and hands, and were violently thrown in different directions.

This was the first scene in this surface panorama, and was considered by eye-witnesses as one of the most terrible yet grandest spectacles ever witnessed at the head of coal pit or shaft, at least in this country. The explosions followed each other at intervals of about fifteen minutes, decreasing in force to some extent each time. Thus it continued until between twelve and one o'clock that night. The gas that was escaping in such fearful volumes from its pent-up reservoir in the mine, no doubt, ascended the shaft in a solid stream in the upward current formed by the water tank's fast motion, which must have been moving at the rate of about fifteen feet per second. The water having been high enough in the shaft to prevent a circulation of air through the mine since a few days after the fire took place, and increasing in its pressure or head continually until it reached the highest point, the escape of gas during this time must have been very limited. When the water had filled twenty-five feet at the shaft-foot all circulation must have been suspended. The highest point reached in the interior of the mine would be about forty (40) feet vertical. This would indicate that the difference between the highest point in the excavated mine and the level of the water when the admittance of atmospheric air was cut off, consisting of fifteen feet vertical, covering an extensive area, must have been a cavity full of gas and air. This cavity would act in this case much like an air chamber attached to a pump, an elastic or spring; besides this, it would be a receptacle for the gas that could penetrate it. The pressure in the aforementioned space must have been increasing from two causes: First, the continued increase of pressure in the strata, which must have been considerable, as the one side of the mine, where the explosion occurred, generated about two thousand (2,000) cubic feet of pure carbureted hydrogen gas under the ordinary atmospheric pressure. The other parts of the mine altogether must have given about the same quantity. What amount of this discharge would be retarded from the increase in pressure from the head of water is hard to tell. Secondly, the pressure upon and consequently the density of the contents of the same must have been affected materially from the increase in the head of water in the shaft. In fact the density of the contents of said aeriform cavity or dry part of the mine must have been sufficient to withstand the pressure from the head of water above it in the shaft at the time.

It was stated by the officers of the mine that so strong was the force of the pent up gas that when there was sixty feet of water in the shaft the timber, that had fell into the shaft from the head frame and otherwise, of large dimensions were kept up from the surface of the water two or three feet by the force of the gas. The head frame, generally called head house, was of wood, but had not a board or plank upon it, yet it was ignited from

the flame of the first great gas explosion, the sparks from which either fell and touched off a fresh supply of gas down near the surface of the water, or else the gas was escaping so fast from below that it ascended to the head and ignited from the burning timber, causing the balance of the intermittent explosions. Those volcanic eruptions, as it were, could be seen for many miles of the surrounding country, and the concussions were felt by several parties in Pittston, a distance of some seven miles easterly; to the west they were not so far heard or felt.

After many months of anxious and hazardous working the mine was again got into working order.

The new Gubal fan, 30 feet diameter, was started, and has been kept running since work was resumed.

I would state that the fan above mentioned was ready the time of the fire, all except about one or two days' work to make the necessary connections, which was to have been completed during the week the mine took fire.

It will be remembered that there was a fan of the same pattern, 20 feet diameter, there since the opening of the mine, and the new fan is erected at the Oakwood shaft or second opening to the **Prospect** shaft.

Since work was resumed they have put in a second water pipe, to the face of the north-west gangway, of the same dimensions as the other one aforementioned, with connections to either of the two shafts; and even with all the above facilities to fight the fire they have had several hard struggles since.

The officers have made some very important improvements in the ventilation by cutting a new return, with its accompanying intake, which enables them to employ additional splits of the main current. In fact this and many others of our mines cannot be worked unless they have the main current divided into many separate currents or splits, at the same time each must have a strong force, as well as large quantity, to prevent them from being too weak to penetrate the corners and places in advance, and not be overcharged with explosive gas. On my visit to this mine in December last, in company with the visiting inspectors from four of the other districts of the anthracite coal fields of this State, I found it in what I called first class condition, considering what difficulties they had to contend against. The officers are Frederick Mercur, superintendent; Wm. Patton, outside foreman, and Wm. Samuel, mine boss.

I would here state that we also visited the Wyoming colliery the same day, and must also state that we found this colliery in most excellent condition in every particular. This mine generates explosive gas at about the same rate as Prospect colliery, in some of its parts, requiring from 20,000 to 25,000 to enable them to drive a gangway and its accompanying airway, and then not be able to carry a naked lamp near the face, when brattice, in advance of the cross-cut, would be within 8 or 10 feet of the solid face. There is over 100,000 cubic feet of air circulated in this mine per minute, being divided into four separate splits. The officers are J. H. Swoyer, general manager; Charles H. Leonard, general superintendent; William M'Culloch, general mining superintendent; Philip Wintersteen, outside foreman, and Jenkin B. Jones, mining boss.

STEAM-BOILER INSPECTION.

Although fortunately we did not lose any lives by explosions of steam-boilers during the year, yet the remarks made in my last report is just as applicable in the present, still they need not be repeated, but wish to call attention to the subject, as I am fully convinced that something should be done in the premises similar to what was recommended in the report of 1875.

Number of Employees in the District during 1879.

	Actual miners.	Employés inside.	Employés outside.	Total.
Number of actual miners employed,	3,697			
Number of men employed, including miners,		8,886	2,322	11,208
Number of boys employed,		1,676	2,698	4,374
Total employés,		10,562	5,020	15,582

Conditions of the Collieries generally, and their Management.

The present condition of most of our mines in this district is satisfactory, although there are yet a few lagging behind for various reasons. I am sorry to say that our present system of management is blamable for most of the complaints that now exist in these mines not up to a fair standard. Mining is conducted on a different scale to what it was a dozen years ago, the mines being more difficult to handle, as they are many times more dangerous, being so much deeper and more extensive. More work is being done in a month now than was done in six months a few years ago. The present vertical depth of workings is from five hundred to nine hundred feet, when there were only a few workings below water-level say ten years ago. Then they employed fifty or one hundred hands; now many have as high as three hundred to six hundred and fifty hands employed inside the mines, exclusive of about twenty to fifty per cent employed as outside hands, employing as high as eight hundred and fifty hands at a colliery. Then no fire damp was met with in our mines, except it be a very rare case; now it is a rare thing to find a colliery without having it in large quantities. Then natural ventilation, small furnaces, steam jets, or exhausts were the principal measures employed as ventilation, with a few fans of very small dimensions; now each colliery is provided with from one to three or four fan ventilators, varying in diameters from fifteen to thirty-five feet respectively—the **Prospect** colliery having three fans, one twenty feet and two thirty feet each in diameter. Exeter colliery has two fans, one twenty feet and one twenty-one feet diameter. The Diamond colliery has two fans, one twenty feet and one twenty-four feet diameter, and an arrangement whereby to connect the fan erected to ventilate the Hollenback shafts, which is thirty-five feet diameter. The Empire colliery has four fans, one fifteen feet diameter at the No. 5 slope; one fifteen feet diameter at the old No. 1 slope, connected to Nos. 4 and 5 slopes; and two on the Hillman seam, one fifteen feet and one twenty feet diameter. Mill Creek colliery has two fans connected or running on the same shaft, ten feet diameter each, and one fan twenty feet diameter; the latter assists in ventilating one

by accumulating fire-damp. However, the comparative pressures were close enough to answer our purpose in proving the advantage gained by splitting the air currents and providing large air-ways. The reader will observe that, with a fixed pressure or water-gauge, more air would be circulated through the Diamond than through the Hollenback workings, showing that the resistance to its passage through the workings was greater in the latter. If both fans were set to run at a speed indicating a certain height of water-gauge, while ventilating their respective mines, the quantity of air exhausted would be no more than when only one fan was running, having both mines open to ventilate from, provided this fan was running so as to raise the same water-gauge. The difference would be in the quantity circulated through each mine, owing to the difference in the resistance met with. In the Hollenback the current would be least, while it would be most in the Diamond, having freer passage in the latter. This was conclusively proved in these tests, and valuable lessons can be learned from them, which might be serviceable to interested persons in the future.

Another suggestive fact was proven in these tests, viz: that the fan indicated nearly the same pressure on the water-gauge while running at a certain velocity, whether it had the one or the two collieries to ventilate from, but it required more steam to run it at this velocity, when both mines were connected, owing to the increased volume of air it had to throw out. In order to place the result of these tests in a clear manner for the reader, they are presented in the following tabulated form:

The Diamond fan.—Diameter, twenty-four feet.

VENTILATING THE	Revolutions of fan.	Water gauge— inches.	Quantity of air exhausted.	Quantity of air exhausted per revolution of fan.	Horse-power.
Diamond mine only, . . .	61	1.6	165,300	2,709.8	41.67
Diamond and Hollenback,	55	1.5	308,800	4,750.7	72.08

The Hollenback fan.—Diameter, thirty-five feet.

VENTILATING THE	Revolutions of fan.	Water gauge— inches.	Quantity of air exhausted.	Quantity of air exhausted per revolution of fan.	Horse-power.
Hollenback mine only,	42	1.7	138,125	3,288.6	37.00
Hollenback and Diamond,	44	1.8	325,000	7,386	92.18

At the **Prospect** Colliery, Lehigh Valley Coal Company, another gaseous mine where large volumes of air must be supplied in order to dilute the fire-damp to a non-explosive condition, the benefit deriving from splitting the air currents has been amply demonstrated. There are two shafts at this colliery, viz: the Prospect and Oakwood, the latter constituting the second opening to the former, and both are used to hoist coal. They are

also connected together underground, at several points, and are ventilated by two fans, located one at each shaft; and both fans are of the same dimensions, and thirty feet diameter. When the **Prospect** fan was started, there were four splits of air currents in the mine, and with a pressure equal to $1\frac{1}{2}$ inches water-gauge, it exhausted 125,240 cubic feet of air per minute. Mr. W. Samuel, the mining boss, believing that better ventilation could be obtained by enlarging the outlet, and splitting the currents into more splits, had the outlet enlarged so as to include forty square feet more area, and divided the air currents into eight separate splits, and was highly gratified at the good results following these improvements. The ventilation was increased 170,000 cubic feet per minute, with a pressure of $\frac{1}{8}$ inch less water-gauge or a total water-gauge of $1\frac{1}{8}$ inches. At the Oakwood shaft, where the other fan was located, the same system of improvements was inaugurated with still better result. The ventilation was increased from about 75,000 cubic feet per minute to 210,400 cubic feet by enlarging the airways, and splitting the four currents they formerly had, into ten separate splits. Thus it is amply demonstrated that by having large airways, and dividing the various currents into quantities which can pass through the workings at low velocities, much greater ventilation is obtained from the same pressure than would be if the conditions were contrary to this. I could enumerate other cases where the advantages of splitting the air current has been well developed and proven a great benefit to the safety and healthy condition of the coal mines of this district; but this shall suffice at present, trusting it sufficient to convince all practical persons of the good results emanating from a judicious system of splitting the air currents.

FIRE IN THE NO. 1 SHAFT, NANTICOKE.

Susquehanna Coal Company.

Of all the perilous situations encountered in the dangerous industry of coal-mining, the prevalence of a fire in a gaseous mine is, I believe, mostly dreaded. When such a misfortune occurs no one can estimate the cost nor the trouble it may cause before it can be distinguished. At the above mine, in the Hillman vein gangway, a fire raged for several weeks against all the force that could be applied to extinguish it. About eight o'clock, A. M., January 24, one of the coldest mornings of that winter, a miner fired a shot in the face of the west gangway, which ignited the gas-blowers and set them on fire. The gas was unusually strong, producing a flame so large that it filled the gangway for several feet back from the face. This did not alarm the miner, for it was only a repetition of what had occurred after nearly every shot fired since he was working in that gangway. He had been able to extinguish it each time with but little trouble, and would have succeeded, perhaps, this time if the water had not been frozen in the pipe somewhere in the shaft, and failed to run when he applied the hose for that purpose. The water flowed slowly for two or three seconds and then stopped; and against all efforts made to stop the progress of the burning flames,

automatically as soon as the bucket ascends through the door-passage. The Delaware and Lackawanna plan has balance arrangement, so that the headman can easily close it when the bucket passes. Both are very good arrangements, and either one is worthy of adoption.

COLLIERY IMPROVEMENTS DURING 1884.

The Lehigh Valley Coal Company.

In February, 1884, a new shaft was commenced by this company on the tract of land now worked from the Exeter shaft. It is located a short distance west of the Exeter shaft, and will be sunk to mine the seams lying beneath those mined in the Exeter. The size of the new shaft is twelve and a half by forty-eight feet, and it will reach a depth of about six hundred feet before cutting the intended seam. A block of coal was left unmined in the Pittston seam, through which this shaft passes, without making connection with the workings of the Exeter colliery. It was sunk at the close of the year 1884 to a depth of three hundred and fifty-five feet.

In the **Prospect** mine, a slope was sunk to the basin on north side of shaft to a depth of eight hundred feet, and an engine, worked by compressed air, is located at the top of the shaft to hoist the coal up. The engines which compress the air are located on the surface near the shaft, and the air is conveyed through pipes to the hoisting-engines in the mine.

At the Henry colliery, a new breaker was erected about three hundred feet north-east of the shaft. It was completed ready to connect with the shaft by the beginning of December, 1884, when work was suspended to tear the old structure away, and connect the new one. It was started about one week prior to the close of the year. This was a very important improvement at this colliery. It has decreased the risk of descending the mine, besides increasing the facilities for shipping coal.

The Dorrance colliery breaker was started June, 1884, and they are shipping a small quantity of coal every month since. The second opening to connect the two shafts was completed by the beginning of October; but, owing to faults and dislocations interrupting the gangways, they have not been able to mine much coal. The mine is ventilated by a thirty-five-foot fan, Guibal pattern, which was started April 24, and is ever since producing ventilation far in excess of their present need, although running but very slowly. Mr. Mercer, the general superintendent of this company, evidently is bent on securing the best kind of machinery, as well as insuring the highest known degree of safety for both men and property.

The Lehigh and Wilkes-Barre Coal Company.

On April 1, this company began sinking their new shaft at South Wilkes-Barre, and located it about three hundred feet south-west of the old shaft. Its size is twelve by fifty-two feet, and it is intended to work the Red Ash and over-lying seams. It is expected to reach the Red Ash seam at a depth of about one thousand three hundred feet, and had reached a depth of two hundred and thirty feet at the close of the year 1884. Its sinking

The new breaker is quite an improvement on the old one. It is furnished with first-class machinery for cleaning and preparing coal for market. Its capacity will be about 800 tons per day. It was started to prepare and ship coal on August 25, 1890.

Lehigh Valley Coal Company.

At the Maltby colliery a new Guibal fan, 18' diameter, was erected on a shaft sunk for the purpose close to the out-crop of the 11-foot seam on the mountain north of the main hoisting shaft. This makes the second fan at this colliery.

In the Prospect colliery a rock tunnel was driven from the Baltimore to the Skidmore seam, a distance of 250 feet, with a sectional area of 9.1 square feet. A tunnel was likewise driven from the Abbott to the Bowkly seam in the same colliery, a distance of 100 feet. Thickness of Skidmore vein 4' 6". Thickness of the Bowkly seam 7'.

In the Midvale colliery a rock tunnel was driven from the level of old slope in the Hillman to the five foot seam, a distance of 300 feet. Sectional area 91 square feet. Thickness of seam 4'.

In the Henry colliery two rock planes were driven through the strata from the Baltimore. The first to the Hillman seam on a pitch of 25°, a distance of 650 feet. The other was driven to the five-foot seam, a distance of 550 feet on the same pitch. Sectional area 100 square feet. This opens up a large district of coal for this colliery.

At the Heidelberg No. 1 slope a new fan 15' diameter has been erected on an opening driven for the purpose on the side of the hill, back of the slope opening. It ventilates the new workings at foot of slope, and the old tunnel workings which were formerly ventilated by a furnace

Delaware and Hudson Canal Company.

In Pine Ridge colliery a rock tunnel was driven from the top split of the Baltimore seam to the bottom split, a distance of 165 feet. Sectional area 72 square feet.

In the Delaware shaft a new gravity plane was driven on a pitch of 7°, a distance of 1,100 feet, with a sectional area of 128 square feet.

Delaware, Lackawanna and Western Railroad Company.

In the Hallstead colliery an underground slope has been sunk in the red ash seam 400 feet, which opens up the coal to the dip of the old slope.

A new inside plane has been completed 900 feet in the same seam on a grade of 4°. These improvements will increase the output of the shaft considerably, likewise shortening the transportation to the foot of the main shaft.

Wyoming Valley Coal Company.

At the Forty Fort colliery an underground slope was sunk on a line with No. 1 tunnel in the bottom split of the Baltimore seam, with a sec-

Undoubtedly the cause of the explosion was that when the gas became ignited from the previous blast, a small feeder was left burning unseen behind the brattice and the brushing brought the gas down in contact with it. The quantity of gas which exploded in the place was very small, but the place being narrow, the men received all there was of it, with no chance of escaping.

RECORD OF COLLIERY IMPROVEMENTS DURING 1893.

Pennsylvania Coal Company.

The new Barnum breaker, which was mentioned in my last report as being in course of construction, was completed and started to prepare coal for market in June, 1893. It is a large and commodious structure, having all the latest improved machinery.

At No. 7 colliery of this company a new air shaft, 12x12 feet, was sunk from the surface a distance of 331 feet to the checker seam, to be used for ventilation. A rock tunnel was also driven from the Pittston to the Marcy seam, a distance of 80 feet, for transportation of coal. In the Hoyt shaft a rock tunnel was driven from the Marcy to the Pittston vein, a distance of 480 feet, sectional area, 91 feet, to be used for the transportation of coal.

At No. 10 shaft a new exhaust fan, 20 feet in diameter was erected on the air shaft, in place of the one removed, it being too small; it will ventilate the workings of the red ash seam.

In No. 14 breaker an 8-foot fan was erected to take the coal dust from the breaker, which was greatly needed, as the coal coming to this breaker was very dry, so that the men and boys were terribly annoyed by the dust.

Lehigh Valley Coal Company.

This company has sunk an underground slope in their Oakwood shaft from the Checker to the red ash vein, a distance of 631 feet, on a grade of 30 degrees; sectional area, 10x13 feet. This slope opened up a large field of good coal in this vein, which is 14 feet in height.

In the Maltby Colliery the company has put in the "tail rope" system on their inside slope, which works very satisfactorily. A pair of first motion engines are situated close to the foot of the shaft which does the hoisting on the slope. The breaker has been rebuilt and enlarged, so that it will have a capacity of 1,500 tons of coal per day. The most approved machinery has been placed in it to clean and prepare the coal. An endless chain haulage, of about 500 yards in length, has been placed on the outside from the breaker to the shaft, which does away with all mules that were used heretofore.

A rock tunnel was driven in the Wyoming Colliery of this company from the five-foot to the Hillman seam, a distance of 195 feet, with a sectional area of 8x12 feet, to be used for transporting coal.

Improvements by the Lehigh Valley Coal Company.

At the Oakwood shaft the second opening to the underground slope has been sunk to the red ash seam a distance of 325 feet, with a sectional area of 230 feet.

An underground slope was also sunk in the red ash vein a distance of 614 feet on a grade of four and one-half degrees. This slope opens up a large field of good coal for this colliery.

The Exeter breaker has been remodelled and enlarged and a new tower erected over the hoisting shaft. The shaft has been repaired from the top to the bottom and the inside workings placed in shape for a large transportation of coal. The buildings at the second opening with the shaft have undergone complete repairs.

At the Wyoming Colliery a 15-foot fan was erected on the old opening of the Hillman shaft, which gives very good results; it is run by a horizontal engine 14x24 inch, and driven by belting.

Improvements by the Old Forge Coal Mining Company.

The Columbia shaft of this company was sunk from the Marcy to the red ash seam, connecting with the workings of their Phoenix shaft and completing the second opening for both shafts.

Improvements by the Butler Coal Company, Limited.

A slope was sunk by this company on the outcrop of the Marcy vein to a depth of 200 feet on a grade of 18 degrees, sectional area 84 feet. The coal is taken to the breaker by a small locomotive.

Improvements by the Delaware, Lackawanna and Western Railroad Company.

A tunnel was driven in the Hallstead shaft from the second to the third seam, a distance of 656 feet, area 6x12.

Improvements by the Algonquin Coal Company.

Two underground slopes were sunk in the Pine Ridge shaft, a distance of 1,100 and 300 feet respectively.

Improvements by John C. Haddock.

In the Black Diamond shaft a tunnel was driven from the Bennett to the eleven foot seam, a distance of 200 feet, area 8x12. An inside gravity plane was built a distance of 1,500 feet for transporting coal to foot of shaft.

Pennsylvania Coal Company, which company began immediately to make important repairs in and about the colliery. The old cribbing in the hoisting shaft was taken out and replaced by new. A general overhauling of the breaker and machinery was gone into and they were placed in first class condition. This company started the breaker to prepare coal on September 10, 1896. Four new Babcock and Wilcox water tube boilers of 150 H. P. each, in two nests or batteries, were installed and put in operation on August 28, and they supply steam to all the engines and pumps about the colliery, thus supplanting 21 cylindrical boilers formerly used at this colliery.

A new 20-foot exhaust fan was installed on the air shaft of the above colliery which gives very satisfactory results and supplies 72,000 cubic feet of air per minute under a speed of 37 revolutions.

Twenty-four new Babcock and Wilcox tubular boilers have been installed by the above company supplanting 71 old cylindrical boilers at their various collieries in this district during the past year.

Improvements by the Mount Lookout Coal Company.

During the time this company was rebuilding the new breaker they sunk No. 2 shaft from the "Pittston" through the "Marcy and Ross" to the "Red Ash" vein, a distance of 327 feet. They also sunk No. 1 shaft down through the Marcy and nearly to the Ross vein, a depth of 200 feet. There have been no developments made in these veins, but they expect to make some in the early part of the summer.

Before this can be done it will be necessary to place a pair of large hoisting engines on the head of No. 2 shaft and to have a new head-frame built, as the present tower for sinking is not strong enough to hoist coal. They expect to finish sinking No. 1 shaft as soon as the weather moderates, so that there will be no trouble with ice in the shaft. This work will have to be done at night as the colliery will be operated as usual during the day.

Improvements by the Lehigh Valley Coal Company.

A rock tunnel has been driven in the **Prospect** Colliery of this company from the "Bowkly" to the "Hillman vein," a distance of 150 feet, which is to be used for transporting coal. At the Maltby Colliery a new fan has been erected which is 25 feet in diameter; engine, 18x36 inch, directly connected.

Colliery Improvements for 1898.

Lehigh Valley Coal Company.

At the **Prospect** Colliery a new breaker has been erected on an entirely new site. The breaker is estimated to have a capacity of between 2,500 and 3,000 tons per ten hours. It is equipped with all of the latest improvements and is constructed in a thoroughly substantial manner. The main posts of the breaker are all cast iron columns which stand on concrete foundations and run to the level of the platform and support all of the heavy machinery of the breaker. Jigs were put in the breaker for handling doubtful and wet coal. The coal is screened over shaking screens driven by eccentrics and constructed somewhat after the pattern adopted by the Philadelphia and Reading Coal and Iron Company. The principal feature of this breaker is the arrangement for cleaning coal in large sizes which will be thoroughly done before it reaches the rolls, and it is proposed to do no further work in the matter of picking slate after the coal passes through the prepared rolls. No arrangements have been put in for picking the slate below the main screens, as it is proposed to do all this work thoroughly on the platform. The coal is carried to the breaker by two lines of conveyors, the flights of which are 10x54 inches; one line takes the coal from the Midvale Hillman slope and the other from the Prospect shaft over which a new steel tower has been erected and an iron self-dumping cage put in and the carriages dump the coal directly into the conveyors. The coal from the Midvale slope is hoisted by two pairs of engines which have been put in this year, and is discharged by the ordinary tail gate dump into the conveyors. A new brick boiler house has been built, and the Babcock and Wilcox pattern of boilers placed therein with a horse power capacity of 1,750. This boiler house is thoroughly modern and up to date in every respect. The forced draft is produced by two Sturdevant blowing fans and the gasses, after leaving the boilers, pass through an economizer of the "American Fuel Economizer" pattern, which extracts the heat remaining in the gasses after passing the boilers. The air is drawn through this economizer by an induction fan of the Sturdevant type. This boiler plant takes the place of 46 old style cylinder boilers which were distributed in seven different boiler houses which have now been abandoned. The steam is carried from the new boiler house to the various engines of the colliery.

Arrangements have been made to sink the Prospect shaft from the Baltimore vein to the Red Ash, and work is now in progress on this shaft.

In the Oakwood shaft of this company a slope has been sunk in the Red Ash vein to a point on a level with the foot of the Prospect

shaft at a point where it will break through to the Red Ash vein. A gangway is now being driven to pass the new shaft so that by the time the rock work breaks through, the foot will be in readiness for business.

The Hillman vein, which has heretofore been worked from the Wyoming Colliery, is now being worked through the slope which has been driven during the past year from the head of the old underground Hillman slope to the surface, which it reaches about half-way between the Wyoming and Prospect collieries. The coal is now hoisted directly to the surface by a pair of engines installed during the past year, and from that point it is handled by a locomotive which enters the old Hillman water course and under the new Prospect breaker to the Midvale Hillman slope, where it is hoisted and dumped into the conveyor line leading to Prospect breaker.

At the Wyoming colliery of the Lehigh Valley Coal Company a narrow gauge railroad has been constructed during the year which connects Wyoming and Prospect collieries. This narrow gauge road also extends to the Henry Colliery so that these three collieries are now connected on the surface.

At the Henry colliery of the above company, extensive improvements have been made in the breaker which greatly increases its facility for cleaning coal. The principal improvements were a traveling platform, and increase of the head room for cleaning the coal in the larger sizes. The breaker has been also equipped with the Ziegler slate pickers. The air shaft has been re-timbered and put in first class repair. The large ventilating fan has been thoroughly overhauled and repaired. A boiler house almost exactly the same as the one erected at the Prospect colliery has been erected at a point half way between Wyoming and Henry collieries, and these two workings are now supplied with steam from this plant.

At the Maltly colliery an opening has been made during the year to the old four-foot workings near the breaker which was abandoned a great many years ago, and coal is now being mined from this seam.

At the Exeter colliery, the Red Ash shaft was sunk to the Red Ash vein and gangways have been driven a considerable distance on each side of the shaft. No chambers have yet been driven, as the second opening is not connected. A four-compartment steel tower has been erected over the shaft, and a 20-foot fan, which is so arranged that it can be used as an exhaust or blower, has been erected and this plant is now in first class condition. Work was commenced at sinking an air shaft which will be about 575 feet deep and is 13 feet 10 inches by 15 feet. It is expected that this shaft will be through to the vein and connections be made in the coal by the middle of August next.

Outside: Hoisting engines, Baltimore shaft.
Remodeling breaker.*
Steel head frame.
Dust system.

South Wilkes-Barre No. 5 Colliery

Inside: Extension No. 10 tunnel, Top to Bottom Baltimore.
No. 24 tunnel, Abbott to Hillman vein.

Stanton No. 7 Colliery

Inside: Rock plane airway, No. 12 tunnel west to No. 29 tunnel.
Extension of No. 13 tunnel to Hillman vein.
No. 15 tunnel, Hillman to Kidney, No. 6 plane counter.
Rock manway, No. 4 slope, Abbott vein.
No. 16 tunnel, Hillman to Kidney, No. 8 plane west.

Sugar Notch No. 9 Colliery

Inside: Extension No. 13 tunnel, Stanton to Hillman vein.
Extension No. 20 tunnel, Baltimore to Five Foot.
Tunnel, Twin to Cooper, No. 9 tunnel west.

Maxwell No. 20 Colliery

Inside: Tunnel, Ross to Twin, No. 18 tunnel west.
No. 23 tunnel, Baltimore to Five Foot.
Outside: Engines, etc., for No. 8 slope.

LEHIGH VALLEY COAL COMPANY

Prospect Colliery

Outside: Extensive repairs to breaker. Extension of the conveyor line to the washery. Changes to engine and drive for Prospect conveyor line and the construction of two overflow catch basins.

Inside: Midvale Hillman mule stable completed. The electric motor haulage, Red Ash vein, was extended to the extreme east. A concrete steel overcast constructed on the shaft level west district. Changes of head of No. 8 rock slope and installation of automatic head block.

Henry—Outside: A series of rock cover test holes for the Hillman vein were completed. An 8-inch Churn drill bore hole from the surface to the Red Ash vein for the changes in high pressure air line was completed. The Enterprise culm bank east of plank road is being hauled to the Henry Washery. A new Lehigh Valley Coal Company standard wooden head frame completed for No. 2 Red Ash shaft. The water course at Prospect was concrete lined with "I" beam reinforcement for the roof from the mouth to the rock. The coal road between the Henry and Prospect was renewed throughout and the old rails replaced with 56 pound rails. A concrete steel bridge was constructed for the Prospect Hillman slope, Plank road crossing.

Inside: An engine and pump were installed in No. 28 slope north of the fault for the extension of operation in No. 28 slope and airway. Preparations were made to construct an intermediate landing in the Red Ash shaft at the Marcy vein level for the haulage concentration

RED ASH COAL COMPANY

Red Ash No. 2.—Ventilation, roads and drainage fair. They are robbing pillars. Condition as to safety good.

PITTSTON COAL MINING COMPANY

Hadleigh.—Ventilation, roads and drainage fair. They are robbing pillars. Condition as to safety good.

WILKES-BARRE ANTHRACITE COAL COMPANY

Hillman Vein.—Ventilation, roads and drainage good; condition as to safety good.

IMPROVEMENTS

LEHIGH AND WILKES-BARRE COAL COMPANY

Hollenback No. 2 Colliery.—Inside: No. 28 tunnel—Red Ash to Ross.

South Wilkes-Barre No. 5 Colliery.—Outside: Remodeled forced draft system. Inside: Rock plane airway—Kidney to Abbott.

Stanton No. 7 Colliery.—Outside: Installed forced draft fan system at Empire shaft boiler house. Erected outside stable. Inside: Extended No. 3 air shaft—Abbott to Five Foot.

Sugar Notch No. 9 Colliery.—Inside: No. 9 tunnel extended to Hillman. No. 23 tunnel Twin to Cooper. No. 16 tunnel Cooper to Five Foot.

Maxwell No. 20 Colliery.—Inside: No. 25 tunnel—Baltimore to Five Foot.

LEHIGH VALLEY COAL COMPANY

Prospect Colliery.—Outside: A new machine shop for repairing cars from Dorrance, Prospect and Henry collieries and for general machine work in the division, was completed and the narrow gauge tracks to same installed. The handling of timber, which previously was done at the respective collieries and sawed by hand, is now done at the Prospect yard in connection with the new machine shop. The timber is taken from the railroad cars by an overhead traveling timber trolley, which carries it to the saw house where it is cut with a steam saw and loaded on mine cars for the various collieries. The washery has been abandoned and removed. During the erection of the new steel breaker, Mineral Spring coal was prepared at this place. Repairs to the breaker were made and a complete fire alarm system installed.

An extra pump was placed in the river pump house, which has been remodeled and enlarged. A series of test holes for proving the rock cover in the river district was drilled. Inside: The driving of No. 22 slope from the Midvale pump lift to the surface at the machine shop was started. In the Five Foot vein a new slope was also started and two new slopes in the Baltimore vein were driven. In the Red Ash vein a new electric hoist on No. 18 slope was installed, and also an electric haulage on the second lift east off No. 11 slope. In the lower Baltimore shaft level east, electric haulage was installed with one new motor. Extensive improvement of the Baltimore vein mule barn were carried on. The securing of the foot of the Oakwood shaft with reinforced concrete and "I" beams was started.

Inside.—12x16-inch hoisting engines provided for Nos. 2 and 3 slopes. Installed two compressed air locomotives. Sump tunnel extended. Tunnel, 6th West to 6th East, No. 12 plane.

Sugar Notch No. 9 Colliery.—Inside: No. 20 tunnel extended to Hillman.

Maxwell No. 20 Colliery:

Outside.—Wash house.

Inside.—No. 27 tunnel, Baltimore to Baltimore; 12x16 inch hoisting engines provided for No. 4 plane. No. 28 tunnel, Hillman to Kidney.

LEHIGH VALLEY COAL COMPANY

Prospect Colliery:

Inside.—The work of securing the foot of Oakwood shaft with reinforced concrete and "I" beams, mentioned in last year's report, is still being carried on. Concrete motor house was built in the Red Ash vein. The Red Ash vein pump room was concreted and made fireproof. The inside barns are being reconstructed of fireproof material. A sub-slope off No. 10 slope in the Red Ash vein was started. Electric haulage was extended in the Upper Baltimore vein and a new motor installed. Diamond drill provings were made in the Midvale slope to prove the Abbott and Bowkley veins. Larger engines were installed on No. 23 slope, Five Foot vein, and a new fireproof engine house constructed. Work was commenced for the driving of a tunnel from the Prospect shaft level, Baltimore vein, to the Skidmore vein, for the purpose of landing the Oakwood-Skidmore coal at the Prospect landing.

Outside.—No. 22 slope, near the new machine shop, was concreted from the surface to the Abbott vein, a pair of engines installed and the crippled cars and supplies for Prospect inside are handled on this slope. A reinforced concrete conduit was constructed under the Lehigh Valley and Central Railroad tracks at the river pump house, and new water and steam pipes laid in the same. Extensive repairs were made to the breaker and pockets, and new shakers were installed. A Welch overwinding device was installed in the Prospect shaft engine house. The work of installing an Ottumwa box car loader was nearly completed. The economizers at the boiler house were removed and a new feed water heater and stack installed. An 8-ton crane was erected in the yard near the breaker to handle supplies from railroad cars. The drilling of a new rope hole for No. 10 slope, to replace the hole now outside the yard near the Laurel Line tracks, was commenced.

Henry:

Inside.—All barns are being reconstructed with concrete to make them fireproof. No. 38 slope was driven in coal to mine small virgin area in the Lower Baltimore vein. The work under way in last year's report for the purpose of concentrating the hoisting of coal at the Red Ash shaft was completed. The construction of the central pumping plant in the Red Ash vein, mentioned in last year's report, is nearly completed; the pump room of concrete and "I" beam construction was finished and the second 18" and 28" and 48"x14"x36" Jeanesville Triplex expansion pump is now being installed. For the purpose of getting the Maltby water to these pumps, No. 36 Rock slope was driven in the Lower Baltimore to the Skidmore vein. The driving in the Skidmore vein toward the Maltby line was commenced and

Outside.—Installed breaker fire lines and remodeled mule barn on No. 4 slope.

South Wilkes-Barre No. 5 Colliery.—Inside: Completed fireproof mule barns on Nos. 3 and 5 shaft levels; No. 8 tunnel extended to Baltimore, and drove tunnel from Abbott to Abbott, 1st east No. 7 slope.

Outside.—Completed addition to power plant.

Hollenback No. 2 Colliery.—Inside: Installed concrete and steel timbering on Baltimore and Red Ash landings to shaft, also in small engine and pump rooms. Completed fireproof mule barn; also No. 31 tunnel, Top Red Ash to Ross; No. 32 tunnel, Kidney to Abbott, and No. 17 tunnel extended to Ross.

Outside.—Completed saw mill and timber yard.

Sugar Notch No. 9 Colliery.—Inside: Completed fireproof mule barn; No. 9 plane Ross to Red Ash; also No. 25 tunnel Hillman to Kidney; No. 26 tunnel, Hillman to Kidney; tunnel, Twin to Ross, 3rd east, No. 5 plane; tunnel, Five Foot to Five Foot, No. 20 tunnel west.

Outside.—Completed fire pump and breaker fire lines, and made addition to mule barn.

LEHIGH VALLEY COAL COMPANY

Prospect Colliery.—Inside: The work of completing fireproof additions to the Red Ash and Baltimore barns was carried out. Man cars were placed on No. 8 rock slope to hoist men from the Red Ash vein to the Oakwood level. No. 57 rock tunnel, 500 feet long, from the Baltimore to the Skidmore vein, Prospect Shaft level, was driven and electric haulage installed therein. No. 58 rock tunnel was driven from the Abbott to the Bowkley vein a distance of 280 feet, for the purpose of mining a virgin area in the vicinity of Oakwood shaft.

Outside.—An addition was built to the breaker to house the box car loader. Three new sets of Compound rolls were placed in the breaker. A concrete engine house for No. 8 slope was completed, in which were installed a pair of second motion engines to replace the old hook engine operating the slope. A mess house, equipped with all improvements and conveniences for the outside employes was started. Work was started on the remodeling of the old car repair shop to accommodate the blacksmith and carpenter shops. A 10 inch rope hole was driven from the surface to the Red Ash vein, a distance of 760 feet, to avoid carrying the rope that operates No. 10 slope over the Laurel Line tracks. A 6 inch hole from the surface to the Abbott vein, for sewage from the mess house, was drilled a distance of 126 feet.

Henry.—Inside: The installation of pumps for water concentration to the Red Ash vein, mentioned in report of 1911, was completed. The fireproofing of the Red Ash, Baltimore and Henry Five Foot barns was also completed. Rope haulage was installed in No. 2 level from No. 11 slope to No. 6 plane and placed in operation. The second opening rock plane from Skidmore to Lower Baltimore vein for No. 36 rock slope was completed. No. 17 plane from Lower Baltimore vein to the Skidmore landing in Red Ash shaft was driven to serve as a manway. Test drilling to prove Hillman and Bowkley veins was also carried on.

tinued. Installed two Williams crushers in order that the refuse could be silted into the mines. A 14-inch bore hole was drilled from the surface to the Baltimore vein for that purpose. A concrete ditch was constructed from the boiler house to the bore hole in order to flush ashes into the mines. An outside hospital was also constructed. A ditch for the installation of steam lines from the Dorrance Colliery to the new office building was constructed and the lines laid.

Prospect Colliery.—The rock work for the installation of the large pump in the Midvale-Hillman vein was completed and concrete side walls were started. A 15-degree rock plane was driven from the Upper Baltimore through a fault to the Five Foot vein. The work of fireproofing the barns in the Baltimore and Red Ash veins was completed. Roof supports were placed in the Midvale slope to support the engine house. A concrete overcast was built in the Red Ash vein. An electric hoist was placed on No. 26 slope, the new slope being driven in the Skidmore vein.

Outside: The Midvale-Hillman slope and No. 10 slope engine houses were made fireproof. A concrete retaining wall was built along the plank road east of Midvale shop. Two 8-inch bore holes were drilled from the surface to the Hillman vein for the purpose of silting boiler ashes. A concrete ditch was constructed to carry ashes from the boiler house to the bore hole. An addition to the small pump house was made to serve as an outside hospital. A mess house which was provided with all conveniences for the employes was completed.

Franklin Colliery.—Concrete batteries were built in the Baltimore vein under the new breaker to allow openings to be filled with silt. A new concrete fire boss station was started in the top Red Ash vein at the head of No. 9 slope. An 18-degree rock plane 150 feet long was driven from the bottom to the top Red Ash vein to mine a basin of virgin coal.

Outside: A new steel breaker to replace the old wooden structure was constructed. A new fireproof office and shop of tile was started. Concrete reservoir was constructed and a 12 inch C. I. pipe line was laid to conduct the water from Worthington pump bore hole to the reservoir. Installed new heads at the Rock and Long slopes. A new fuel conveyor line from the breaker to the boiler house was constructed. One 16 inch and two 8 inch holes were drilled from the surface to the Red Ash vein, a distance of 450 feet, to conduct the silt from the breaker to the mines. A 6 inch hole was drilled from the surface to the old Baltimore workings for drainage of the condemned coal conveyor pit. The Long slope engine house was reconstructed of fireproof material. A 16 by 20 inch engine was placed on the Brown slope to facilitate haulage.

Warrior Run Colliery.—Drove a tunnel from the Hillman to the Five Foot vein, a distance of 505 feet, for which a second opening 230 feet long from the Five Foot to the Hillman vein, was started. A concrete overcast for the return air from the Mills vein was built in the Hillman vein. No. 8 tunnel from the C to the D vein was completed. The mouth of the B vein slope was concreted.

Outside: A concrete fan house over the E vein shaft was completed. The outside plane engine house was made fireproof. A new hospital 10 by 14 feet was also constructed of fireproof material. Part of the wooden flume to conduct water across the property was reconstructed.

Maxwell No. 20 Colliery.—Completed No. 29 tunnel, Hillman to Kidney; tunnel, Hillman to Hillman, 2nd South, No. 10 slope; tunnel Red Ash to Red Ash, No. 21 tunnel west; tunnel, Five Foot to Baltimore, No. 27 tunnel east; tunnel, Hillman to Hillman, 1st South, No. 10 slope; two tunnels, Bottom to Top Red Ash, No. 20 tunnel east. Remodeled the Red Ash shaft level barn and built a new barn in No. 5 slope.

Hollenback No. 2 Colliery.—Completed No. 38 tunnel, Top Red Ash to Ross. Installed 16 inch by 8 inch by 18 inch pump in No. 2 slope extension. Outside: Installed an air compressor.

Sugar Notch No. 9 Colliery.—Completed Nos. 27 and 30 tunnels, Bottom to Top Red Ash. Outside: Remodeled the breaker.

LEHIGH VALLEY COAL COMPANY

Dorrance Colliery.—No 23 tunnel, 200 feet long, was driven from the Cooper to the Bennet vein through the fault. No. 24 tunnel from the Cooper to the Lance vein was started and driven about 20 feet. Three concrete overcasts in No. 24 slope district, Red Ash vein, were completed. A new Jeanesville pump in the Baltimore vein was placed in operation. An engine was installed at head of No. 21 plane. The engine at the head of No. 21 slope, Hillman vein, was relocated and a fireproof room is being constructed. An engine was installed at the head of No. 25 slope, Red Ash vein, and a fireproof engine room was constructed. The Red Ash barn was extended by the addition of five concrete stalls. The motor from West plane was transferred to the head of the Five Foot plane.

Outside: A new steel fuel line is being constructed from the breaker to the boiler house. Work has been started on the installation of an additional 300 H. P. boiler plant. A concrete driveway was laid through the colliery yard. A powder house was constructed of metal lath and plastered on the inside as also on the outside. A concrete and terra cotta tile office was built. A new crusher, elevator and engine and fireproof engine house were installed on the ash line from the boiler house to the bore hole. Concrete retaining walls were built along the tail tracks. A fireproof engine house was erected over the conveyor engine under breaker. The shaft tower was braced and concrete pillars placed under the columns.

Henry Colliery.—Inside: No. 74 tunnel, from the Hillman to the Bowkley driven 370 feet. A new concrete hospital is in course of construction. A concrete roof was placed over pumpway in Red Ash vein. Completed manway to No. 28 slope. Started slope in Red Ash vein west to the shaft.

Outside: Mine tracks were regraded from hoisting shaft to colliery fence and a concrete retaining wall built alongside of the tracks. A new brick blacksmith shop was erected. The Henry Five Foot, Baltimore and Wyoming Baltimore fan houses were made fireproof. The reservoir was fenced in. A new road was laid through colliery yard. Feed water regulators and Watts pump governors were installed in the boiler house. A 10-inch bore hole was drilled from the surface to the Five Foot vein and the old culm bank is being flushed into the workings.

Prospect Colliery.—Inside: Installed a Scranton pump in Hillman vein. All refuse from the breaker and boilers is now silted into the mine workings. An 8-inch bore hole was drilled from the Abbott

to Hillman vein to conduct steam pipes. A 6-inch bore hole from the Abbott to Bowkley and a 6-inch bore hole from Bowkley to Hillman vein were drilled so as to concentrate drainage at Midvale in the Hillman vein. The placing of concrete and steel roof supports at the foot of the Red Ash was started. An electric hoist was installed at foot of slopes Nos. 26, 28 and 29. Installed an air compressor at head of No. 4 plane. A concrete overcast was constructed in Red Ash vein.

Outside: The Midvale Abbott fan house was reconstructed of reinforced concrete. One Gates crusher, two Williams pulverizers and an 18 inch by 30 inch engine were installed under the breaker to crush refuse before flushing into the mine workings. A shaft was sunk from the surface to Hillman. A concrete and terra cotta ditch was constructed from the breaker to the shaft to conduct refuse from the breaker into the mines. A 16-inch bore hole was drilled from the surface to the Hillman vein, a depth of 520 feet, and 12-inch column line installed for discharge from the new pump in the Midvale-Hillman vein. A spray system for fire protection was installed in the breaker and pump placed in the boiler house to pump water from the reservoir to head of breaker. Seven Simplex jigs were installed in the breaker. Installed a 125 K. V. A., Allis-Chalmers, 220 volt engine, which will furnish light for Dorrance, Prospect and Henry collieries, and the new office building of the Company.

Franklin Colliery.—Inside: Completed No. 30 tunnel, Baltimore to Sump vein. Started No. 14 rock plane, Red Ash to Top Red Ash; No. 15 plane, Skidmore to Baltimore vein. Completed concrete fire boss station on No. 9 slope, and one in No. 6 tunnel.

Outside: A new fireproof engine house of concrete and terra cotta tile was constructed for the Rock slope. A mess and wash-house of concrete and hollow tile was also constructed for employes. The tile shop and office were completed. Concrete foundations for installation of a new Multi-vane steel fan and engine house at the Red Ash shaft were completed. The exhaust from the breaker engine was conducted into the feed water heater in the boiler house. Driveways under breaker were paved with brick. A 20-inch bore hole for discharge from the Worthington pump has been drilled.

Warrior Run Colliery.—Inside: No. 30 rock plane was driven from Five Foot to the Hillman vein for ventilation and second opening. An engine was installed in the Mills vein to handle coal from the west side of No. 22 tunnel. A drift was driven from the surface into the "E" vein.

Outside: The "B" slope engine house, inside slope engine house and compressor house were made fireproof with metal lath and plaster. Foundation walls under the boiler house were reinforced. Two new fireproof foremen's offices were erected.

DELAWARE AND HUDSON COMPANY

Baltimore No. 5 Colliery.—Completed tunnel, through anticlinal, Baltimore to Baltimore vein; electric locomotive road through fault in Red Ash vein on shaft level; 6-inch bore hole, 267 feet deep, Hillman to Baltimore vein at Conyngham. Installed an 8-inch centrifugal 1,500 gallon Sludge Pump on surface. Washery refuse from Baltimore No. 5 to Conyngham for inside filling.

On the morning of January 3, 1901, David J. Williams, mine boss and William Morgan, Martin Fortune and Wm. Earley, fire bosses of Laurel Run colliery went into the mine about 9 A. M., in company with a rock contractor, by the manway and descended to the Checker vein inside slope to locate a rock shaft which is as I understand to be sunk to Red Ash vein. After the contractor went out the above four men went down to the third lift to make an examination, and proceeded through some of the workings which were the returns from the fire, and when they found that they were so badly affected by damp they turned to go back and had reached the slope when they all fell, with the exception of Williams who started up the slope for help but failed to reach the top. Towards evening the outside foreman, Seaman Stucker became alarmed and sent for some of the workmen to look for them. When they were found about 9 P. M., Williams and Morgan were dead, Fortune and Earley after considerable exertion by the doctors were restored to consciousness in a few hours. Fortune died on the 10th of January, from the effects, but Earley fully recovered. What induced Mr. Williams to go into the mine after having been ordered to keep out is hard to say, as he was naturally bright and had filled the position of mine foreman for years before for other companies.

Burning of No. 14 Breaker.

On February 18, 1901, the large No. 14 Breaker of the Pennsylvania Coal Company located in Jenkins township, caught fire and was burned to the ground, and the employes were idle for some time until room in the other collieries of the company could be made for them. A new breaker has been built and the machinery is now being installed, with expectation of commencing to prepare coal by April 1, of this year. The breaker has a capacity of 3,000 tons per day and will have all the latest improved machinery. A new washery has been built in connection with the breaker to prepare all the refuse from it.

In January, 1901, the large "Babylon breaker" and washery of the Temple Iron Company were destroyed by fire. How it originated remains a mystery; the colliery has been idle since, the company having declined to rebuild. All the coal will be taken to the Lawrence breaker for preparation for market as soon as roads are built.

Improvements by the Lehigh Valley Coal Company During the Year 1901.

Prospect Colliery...The Prospect shaft was completed to the Red Ash vein and the hosting engines have been equipped with spools

for winding flat ropes five-eight inches thick by six inches wide. These ropes are now in service and giving great satisfaction.

A rock tunnel was driven from the Baltimore vein to the Five foot, a distance of 488 feet. The vein was found in good condition and about five feet thick. The second opening for this tunnel is a rock plane on a pitch of thirty degrees. The total length of which is 199 feet. At the end of the year a connection was made in the coal from the plane to the tunnel.

In the above colliery a tunnel has been driven through the fault at the fourth lift of the Midvale Hillman slope which enables the company to concentrate all the transportation from the lower levels of the Midvale slope at one point.

At the Prospect Hillman slope a fire was discovered in the airway of the proving slope Hillman vein, on the 12th of April, which was caused by a gas feeder becoming ignited from a Bratticeman's lamp. The fire was fought for some hours but it was found that gas was accumulating inside of the location of the fire. It was therefore decided to fill the slope with water which was promptly done and the fire was extinguished.

During the year it was decided by the Lehigh Valley Coal Company to reopen the Mineral Spring Colliery which has been shut down since 1889, and work was commenced sinking two shafts to the Red Ash vein. The old Baltimore slope has been reopened to the third lift and preparations are being made for sinking a slope in the Checker vein to open up the coal to the north. A ventilating fan has been erected which will ventilate this slope.

The Coal Brook slope which has been idle since 1889, is being put in condition. The water has been pumped out and the gangways are being put in order for mining coal. The foundation for a new breaker has been constructed and the foundation for a 1,000 horse power boiler plant of the Babcock and Wilcox type, has been completed.

The Henry breaker has been converted into a washery and is now being operated as such. Two shafts have been commenced from the surface to reach the Red Ash vein, which are being sunk through a large pillar left in the Baltimore vein for that purpose. The idea being that all veins under the Baltimore, shall be mined without any connection with the overlying seams. Both of these shafts were down to the rock, and about twenty-five feet into the solid rock at the end of the year, and the concrete cribbing was completed. The cribbing is forty-five feet in depth.

A rock tunnel has been driven from the Upper to Lower Baltimore vein in the north workings of the Henry colliery. The total length of which is 569 feet. The second opening for this tunnel is a shaft from the Upper to Lower Baltimore vein, forty-one feet in depth.

LEHIGH Valley
COAL Co

placed at the head of slope to hoist the coal to breaker. Likewise a pair of engines was erected at the head of Coal Brook slope to hoist the coal.

At the **Prospect Shaft** a brick addition to the boiler house was made enclosing a 250 horse power B. & W. boiler. A new brick engine house has been completed. In the Midvale slope on different levels. Three rock tunnels were driven from the Hillman to Brookley veins, which will be used for the transportation of coal.

In the Hillman slope a rock tunnel was driven from the Hillman to the Bowkley veins.

At the Henry colliery the hoisting shaft was extended from the Baltimore to Skidmore veins. A rock tunnel was driven through an overlap to the five-foot, 220 feet. The second opening tunnel is being driven at present.

The two new shafts begun in 1902, were sunk to Red Ash vein, a distance of 675 feet from the surface. A brick engine house 34x72 feet was erected for the hoisting engines of these shafts.

The Wyoming shaft, the old wood cribbing from the surface to the rock, was replaced by concrete, which makes a good job at this shaft.

At the Heidelberg No. 1 slope a new rock plane, 18 degree pitch, was driven from the lower split to the upper split of Red Ash vein, a distance of 212 feet. The second opening was driven on a 30 degree pitch. A rock slope is being sunk from the Marcy to Clark vein, also a second opening shaft for same.

A new 12-foot diameter ventilating fan was erected. A new brick boiler house was built, enclosing a 450 horse power return tubular boiler. Dispensing with the old boiler plant.

Improvements by the Delaware and Hudson Company

At the Baltimore tunnel the General Electric Company has installed an electrical haulage which handles all the coal from the Red Ash vein to the mouth of tunnel, doing away with the use of a rope haulage plant and hoisting plant at No. 4 shaft. The Stanton vein slope has been extended 250 feet. A new breaker is in course of erection to prepare the coal which is now taken to No. 5 breaker for preparation.

Improvements by the Hudson Coal Company

A new breaker has been completed at Pine Ridge with a new steel head frame erected over the shaft. The foot of the shaft has been remodeled by brick arching and a chain hoist put in for handling the empty cars. To accomplish all of the above work at the foot of

No. 33 Tunnel driven through over turn basin in Mineral Spring shaft district, Red Ash vein.

Inside slope extended in Red Ash 600 feet.

Rope hole completed to Red Ash vein.

300 H. P. return tubular boiler installed at Coal Brook.

Breaker has been equipped with mechanical pickers.

William Crusher, new bore holes and pipe lines extended, taking care of all the silt and refuse from breaker.

New 20 foot double intake Guibal fan driven by Corliss engine.

Brick house.

Henry Colliery.—300 H. P. B. and W. water tube boiler installed.

New 25 foot double intake fan driven by Corliss engine.

Concrete air shaft completed in Five Foot vein.

New 25 foot double intake fan driven by Corliss engine, brick house, completed in Red Ash shaft.

New 16x24 hoist engine and brick house completed and Five Foot slope reopened.

New second outlet completed in Borroughs tract, Five Foot vein.

Two tunnels with second outlet completed in Red Ash shaft district.

New inside barn completed in Red Ash.

New brick overcast, empty car foot turnout, column and steam lines installed in Red Ash shaft.

Rock slope completed in Wyoming shaft district, from lower Baltimore to Skidmore vein.

Rock slope from Baltimore to Skidmore vein completed in Henry shaft district.

Nos. 21, 22 and 23 subslopes started in Red Ash district.

Prospect Colliery.—300 H. P. B. and W. water tube boiler added to the plant, brick house.

New inside barn Red Ash.

New electric transportation outfit has been installed consisting of one 175 K. W. 250 volts generator, directly connected to 20x18 McEwen engine, 225 R. P. M.

Two electric locomotives installed in Red Ash and Baltimore.

William crusher and extension of silt lines.

Additional mechanical pickers in breaker.

Additional fire emergency pump 16x10x16.

Lafin.—No. 4 plane, bottom split Red Ash, extended 900 feet in rock and coal.

No. 3. plane, bottom split Red Ash, extended 230 feet.

Pine Ridge.—No. 31 tunnel driven from Rock to Hillman 240 feet.

No. 12 slope Rock vein extended 650 feet and pair of 12x16 inch engines installed.

Pair of 8x12 inch engines installed for sinking No. 13 slope in Hillman vein.

Pair of 8x12 inch engines installed for sinking No. 14 Kidney slope.

Laurel Run.—No. 11 tunnel extended 750 feet toward Red Ash vein. Haulage road toward Pine Ridge driven 950 feet in Checker vein. New 28 foot Guibal fan installed, but as yet not in commission. The laurel Run breaker was abandoned August 1, and all coal from this colliery prepared at Pine Ridge breaker.

Baltimore No. 2.—No. 7 slope extended 950 feet Red Ash vein.

Prospect Colliery.—The electric transportation roads have been extended in the Red Ash Vein, and preparations are under way for the installation of further electrical equipment in haulage hoist and dumping in this colliery.

Dorrance Colliery.—Tunnels were started from the foot of the Baltimore shaft to tap the Red Ash Vein, also a tunnel at that point for the empty car and foot turnouts.

Tunnels Numbers 11 and 12 were completed from Hillman to the Bowkley.

Tunnels Numbers 15 and 17 completed from 5 foot vein to the Hillman Vein.

Tunnel Number 16 completed from Hillman to Abbott.

Tunnels Numbers 18 and 19 completed from Cooper to the Bennett through the Mill Creek anticlinal.

The tunnel from the foot of No. 6 Rock slope was finished to the Bennett Vein, and a second outlet tunnel through the Mill Creek anticlinal is being driven.

A new stable is being constructed in the Hillman Vein.

Silting has been extensively carried on at this colliery in the Hillman, Abbott and Bowkley Veins.

A new No. 20 sub-slope in the Baltimore has been started.

Numbers 14 and 16 sub-slopes have been continued in the Cooper Vein.

Number 15 sub-slope in the Bennett and No. 13 in the Red Ash have been continued.

Number 2 slope in the Baltimore Vein has been reopened and is being extended.

Number 12 slope in the Hillman River Warrant has been extended.

A new electrical hoist and transportation outfit is being installed.

A new brick concrete mine locomotive house built.

Dust house torn down and replaced with stack devices for killing dust.

A new frame carpenter and blacksmith shop completed.

New standard warehouse built.

Franklin Colliery.—Number 10 Rock slope surface to rope vein completed, giving an additional outlet for the Rock slope Red Ash-Ross district.

Number 21 Tunnel finished from sump vein to 5 foot vein.

Number 22 Tunnel finished from sump vein to Baltimore vein.

A new central pumping plant is under construction in the Red Ash vein, equipped with 28x12x36 compound duplex pump, with 14 inch column pipe bore hole, 12 inch steam hole and exhaust hole from the Red Ash to the surface.

A 14 inch drainage bore hole from the surface to the Ross vein has been made through which all the water from the upper lifts of the long slope district will be drained to the central pump plant in the Red Ash.

New steam lines are under construction for the above plant.

The following slopes were extended during the year:

Number 9 Slope Top Split of Red Ash.

Number 4 Bottom Split of Red Ash.

Number 11 Slope Sump Vein.

Number 7 Slope Sump Vein.

Number 8 Top Split of Red Ash.

Outside barn remodeled to Lehigh Valley Standard; concrete floor and mangers. New 18x30 mule hospital.

Enterprise bank west of Plank road exhausted and Henry bank being reclaimed.

Preparations are under way to reclaim old **Prospect** bank. This is to be taken to Henry Washery by means of locomotive.

Prospect Colliery.—Stables for 75 mules in Red Ash completed. New electric hoist in operation on new slope west workings.

No. 10 Slope regraded through fault. A new concrete steel overcast has been put in this vein over No. 10 Slope. Second opening for Rock slope, Skidmore workings.

New mule stable in Midvale Hillman slope. New 500-ton washery completed and in operation.

Extensive repairs have been made to breaker and jig foundation. Colliery office remodeled and new loaded scales installed.

Dorrance Colliery.—Red Ash tunnel and plane completed. Second opening to No. 6 Extension Tunnel completed. 5 concrete steel overcasts in Baltimore vein completed. 1 Undercast and direct return at head of Slant slope completed.

Vein connection made through Mill Creek anticlinal from No. 18 Tunnel Upper Baltimore to Plank road, Upper Baltimore workings. 2-10 ton electric locomotives installed in Hillman vein.

New slope is being driven in Hillman to connect with No. 15 and No. 17 tunnels from 5 Foot vein.

Extension was made to new Hillman vein stable.

Outside

New 350 K. W. 250 volt generator installed. Work is now being done on new 25x14 upcast shaft, from surface to Baltimore vein.

Franklin Colliery.—Central pumping plant in Red Ash vein completed. No. 8 Plane equipped with engine, steam from surface through bore hole. Nos. 23 and 24 tunnels Top Red Ash to Bottom Red Ash. No. 9 Slope district completed.

10 inch Water line from Column bore hole to reservoir completed. New steam line from boiler house to Red Ash Central pumping plant completed.

LEHIGH AND WILKES-BARRE COAL COMPANY

Hollenback No. 2 Colliery, Inside.—No. 18 Tunnel extended to Ross.

No. 19 Tunnel extended to Ross.

Rock Plane airway Stanton to Hillman.

No. 5 Slope graded through rock.

South Wilkes-Barre No. 5 Colliery, Inside.—No. 7 Slope extended from Abbott to Hillman. Pumping plant No. 2 Slope.

Stanton No. 7 Colliery, Outside.—Slush hole, Surface to Hillman. Slush hole, Surface to Stanton.

Inside.—Mule barn Red Ash Shaft Level. Pumping plant No. 4 Shaft Level.

Maxwell No. 20 Colliery, Outside.—Breaker remodeled. Timber saw mill. 500 H. P. water tube boilers. Engines and rope holes for Nos. 8 and 10 Slopes.

We believe that the ends of justice will be fully met by suspension of sentence in a case where conviction itself must carry its own condign punishment.

Accidents will happen in and around the mines no matter how great a degree of care is exercised, but many of the distressing fatalities could be avoided if employees were made to feel that acts of gross and inexcusable carelessness made them liable to criminal prosecution. In all mines, no matter how well they are planed and conducted, danger constantly exists, and most of the accidents that occur in and around the mines are due to carelessness. In nearly all the cases the law does not and cannot be made to apply.

Intelligence, the education of experience, accurate judgment and the power to enforce rigid discipline cannot be implanted in men by legislative enactment.

ACCIDENT AT MIDVALE SLOPE, PROSPECT COLLIERY

At 12.30 noon, May 13, a fall of roof occurred in No. 4 lift road, No. 246 Bowkley vein in Midvale slope, Lehigh Valley Coal Company, by which Martin Degnan, timberman, Andrew Wasko, timberman's helper, Paul Bozent, miner, Peter Zwinski, driver, and Michael Libzak, doorboy, were instantly killed and two others slightly injured. It appears from testimony taken at the Coroner's inquest held at Wilkes-Barre, that Anthony Smith, runner, had run a trip of two loaded cars down a section and had failed to place the proper number of sprags in the wheels, which allowed the trip to get beyond control. When the trip landed on the gangway road it jumped the track discharging four props that stood on the lower side of the road, and a portion of the roof fell on top of the cars. The runner sent the driver to call the timberman to replace the cars on the track and to secure the roof. When the timberman arrived they replaced one of the cars on the road and pushed it back so that they could replace the other derailed car and the props. While this was being done, a large piece of top rock fell, without warning, catching seven of them. It also appears from the testimony that the timberman had failed to sound or examine the roof before they commenced to work at the derailed cars. He should have seen that the roof was safe to work under, knowing that all the props under this particular piece of rock had been discharged.

The following is the verdict of the Coroner's jury in the case:

"We find that Martin Degnan and others came to their death from injuries received at the Midvale Slope of the Prospect Colliery of the Lehigh Valley Coal Company, May 13, 1908. The evidence shows that a run-away occurred in the gangway, the cars jumping the track and knocking out four props that stood along the side of the gangway to protect the roof. A fall of rock occurred which Martin Degnan attempted to remove. Others were watching his movements when a second fall took place fatally injuring five men. The props that were

knocked out were not reset, nor had any precaution been taken to secure the roof by the workingmen before trying to get the cars back on the track.

We therefore find that the men took no precaution whatever for their own safety and that the said company were in no way responsible for the accident. Jury: John Nygren, Patrick Hourigan, William Bower, Griffith Pritchard, F. D. Vincent, W. S. Casterlin."

CONDITION OF COLLIERIES

LEHIGH AND WILKES-BARRE COAL COMPANY

Hollenback No. 2 Colliery.—Ventilation, drainage and general condition as to safety good. Ventilation very much improved by erecting several new air bridges.

South Wilkes-Barre No. 5 Colliery.—Ventilation good; roads and drainage good; condition as to safety good.

Stanton No. 7 Colliery.—Ventilation good; roads and drainage good; condition as to safety good.

Sugar Notch No. 9 Colliery.—Ventilation fair; roads and drainage fair; condition as to safety good.

Maxwell No. 20 Colliery.—Ventilation good; roads and drainage good; condition as to safety good.

LEHIGH VALLEY COAL COMPANY

Prospect Colliery.—Ventilation good; roads and drainage fair; condition as to safety good.

Dorrance Colliery.—Ventilation good; roads and drainage fair; condition as to safety good.

Franklin Colliery.—Ventilation good; roads fair; drainage and condition as to safety good.

Warrior Run Colliery.—Ventilation good; roads and drainage fair; condition as to safety good.

DELAWARE AND HUDSON COMPANY

Baltimore No. 5 Colliery.—Ventilation good; roads and drainage good; condition as to safety good.

Baltimore Tunnel Colliery.—Ventilation good; roads and drainage good; condition as to safety good.

Conyngham Colliery.—Ventilation good; roads and drainage good; condition as to safety good.

RED ASH COAL COMPANY

Red Ash Nos. 1 and 2 Collieries.—Ventilation good; roads and drainage fair; condition as to safety fair.

PITTSTON COAL MINING COMPANY

Hadleigh Colliery.—Ventilation good; roads and drainage fair; condition as to safety good.

WILKES-BARRE AND SCRANTON COAL AND IRON COMPANY

Hillman Vein Colliery.—Ventilation good; drainage good; condition as to safety good.

IMPROVEMENTS

LEHIGH AND WILKES-BARRE COAL COMPANY

Hollenback No. 2 Colliery, Inside.—No. 23 Tunnel-Bottom Red Ash to Top Red Ash.

Rock plane airway Bottom Red Ash to Top Red Ash.

New pumping plant Baltimore Shaft level.

Outside.—New shaft hoisting engines for Baltimore level.

Remodeling breaker and annex.

Steel head frame.

South Wilkes-Barre No. 5 Colliery, Inside.—No. 19 Tunnel, Hillman to Kidney.

No. 21 Tunnel, Baltimore to Five Foot.

No. 22 Tunnel, Baltimore to Five Foot.

No. 20 Tunnel, Hillman to Kidney.

No. 23 Tunnel, Top Baltimore to Bottom Baltimore.

Rock plane airway, Bottom Baltimore to Top Baltimore.

Outside.—Paving retail wagon road, and new scales.

Stanton No. 7 Colliery, Inside.—No. 13 Tunnel, Hillman to Hillman.

No. 14 Tunnel, Baltimore to Five Foot.

Slush Hole, Surface to Baltimore.

No. 12 Tunnel, Skidmore to Hillman.

No. 29 Tunnel, Stanton to Hillman.

Sugar Notch No. 9 Colliery, Inside.—No. 21 Tunnel, Twin to Cooper.

No. 9 Tunnel, Extended to Five Foot.

No. 20 Tunnel, Ross to Baltimore.

No. 15 Tunnel, Extended to Hillman.

Maxwell No. 20 Colliery, Inside.—Tunnel, Top Red Ash to Bottom Red Ash.

Tunnel, Top Red Ash to Bottom Red Ash.

No. 22 Tunnel, Baltimore to Five Foot.

No. 24 Tunnel, Baltimore to Five Foot.

New pumping plant, 4th Lift.

Outside.—Dust system installed in breaker.

LEHIGH VALLEY COAL COMPANY

Prospect, Outside.—Repairs to breaker. New refuse conveyor line.

Inside.—Air shaft from Lower to Upper Baltimore in Klondyke Slope district. Motor haulage in Red Ash and Baltimore veins extended.

Ash to Ross; rock plane, Hillman to No. 17 tunnel; tunnel, Abbott to Abbott, 1st East; No. 22 tunnel, Top to Bottom Red Ash; tunnel, Ross to Top Red Ash, and No. 23 tunnel, Abbott to Kidney vein. Extended No. 17 tunnel to Kidney. Drove 10-inch bore hole to the Baltimore vein.

Sugar Notch No. 9 Colliery.—Completed No. 31 tunnel. Twin to Hillman, and a tunnel from Station to Five Foot vein.

Maxwell No. 20 Colliery.—Completed a tunnel from Red Ash to Red Ash, and No. 31 tunnel, Red Ash to Ross vein.

Empire Washery.—Installed pea and chestnut spirals.

LEHIGH VALLEY COAL COMPANY

Dorrance Colliery.—Inside: Two electric motors were placed in service in the Lance, Cooper and Bennett veins. A 4-inch drainage bore-hole was drilled from the Baltimore to the Red Ash to drain silt water. No. 26 tunnel was driven from the Bowkley to Abbott vein, 210 feet long. No. 27 tunnel was driven from No. 21 tunnel into Lance vein. No. 24 slope, in the Red Ash vein, was graded and tunnel commenced through the anticlinal at the foot of the slope, in order to facilitate haulage. Completed No. 24 haulage, Cooper to Lance vein.

Outside: Installed an additional 300 horse power boiler in boiler plant. A spray system was placed in breaker, and a pump installed, and pump line laid from pump to breaker, and pump house erected near reservoir. The construction of a steel fuel conveyor was continued. A fence was built around tracks, and bridge constructed over tracks near head of shaft for traveling way and safety.

Prospect Colliery.—Electric cables in shaft were renewed. Considerable grading was done at the head of Nos. 26 and 29 slopes in the Skidmore vein. A 15-degree rock slope, 80 feet long, was sunk through fault from Lower Baltimore to Upper Baltimore vein, for a return airway. Two bore holes were drilled from the Five Foot vein to drain water from Prospect Hillman slope workings to the Oakwood pump. Edison electric safety lamps were purchased for use in the Red Ash vein. Concrete and steel timbering at foot of Red Ash shaft continued.

Outside: Steam lines were recovered. The fuel line from breaker to boiler house was rebuilt. A new roof was placed on the boiler house. The supply yard was rearranged. Steel bents were put under main conveyor from the Prospect shaft to the head of the breaker. A condenser was placed in the river pump-house. The old boiler house at Oakwood shaft was remodeled for a washhouse and lamphouse.

Henry Colliery.—No. 74 tunnel from the Hillman to the Bowkley vein was completed, and a 30-degree rock plane 152 feet long was driven for a second opening. A 45-degree rock plane was driven from the Five Foot to the Hillman vein, the Wyoming Five Foot slope, for a return airway, and to improve the ventilating conditions. The concrete hospital at the head of No. 11 slope was completed. A concrete roof was constructed over the barn in the Red Ash vein, west of the shaft. A 10-degree rock plane, from the Five Foot to the Hillman vein, was started. An air shaft was sunk and concreted to the Hillman vein, Prospect slope, for an intake. Considerable rock grading was done on No. 39 slope, in the Skidmore vein, to improve haulage conditions. The Henry shaft was abandoned.

CONDITION OF COLLIERIES

LEHIGH AND WILKES-BARRE COAL COMPANY

Hollenback No. 2, South Wilkes-Barre No. 5 and Stanton No. 7 Collieries.—Ventilation, roads, drainage and condition as to safety, good.

LEHIGH VALLEY COAL COMPANY

Dorrance, **Prospect** and Henry Collieries.—Ventilation, roads, drainage and condition as to safety, good.

WILKES-BARRE ANTHRACITE COAL COMPANY

Hillman Vein Colliery.—Ventilation, roads, drainage and condition as to safety, good.

RED ASH COAL COMPANY

Red Ash No. 2 Colliery.—Ventilation, drainage and roads, fair. Condition as to safety, good.

IMPROVEMENTS

LEHIGH VALLEY COAL COMPANY

Dorrance Colliery.—Completed tunnel No. 24 in the Red Ash vein and installed an electric motor for haulage on this level. No. 28 tunnel from Baltimore to Five Foot vein was started.

Outside: Completed a new steel conveyor carried on steel bents to the boiler house.

Prospect Colliery.—A 4-inch steam line was laid from the new steam bore hole to No. 5 slope engine in the Upper Baltimore, previously operated by air.

Telephone connections were extended to the head of No. 5 slope, to the foot and head of No. 4 Rock plane, and also to No. 26 slope in Skidmore vein.

A 4-inch drainage bore hole, on an 18 degree pitch, was drilled from the face of No. 9 tunnel to Midvale-Hillman vein, to assist in unwatering this mine, which was flooded by the cave under Mill Creek, December 19, 1915. Installed a Goyne pump, 12 by 18 by 18 inches, at the foot of Oakwood shaft, to pump this water to the surface, and a concrete pump-house was built for the same.

Outside: Steel bents were erected under conveyor lines. New cribbing was inserted in Prospect shaft from the surface to the rock. Renewed 700 feet of 8-inch pipe in the water lines.

An 18-inch bore hole was sunk from the surface to the Skidmore vein to handle water. A 12-inch bore hole was put down from the surface to the Upper Baltimore vein to carry steam to the engine at the head of No. 5 slope, and a 10-inch bore hole was started from the surface to this engine to be used for exhaust steam.

Two wooden flumes were constructed to divert the waters of Mill Creek from the cave, which occurred on December 12, 1915.

Blowers were installed in the boiler room.

Henry Colliery.—Completed No. 20 rock plane driven on a pitch of 10 degrees from the Top Five Foot to the Hillman vein; No. 75 tunnel, through anticlinal; rock tunnel from Top to Bottom Five Foot, and a rock skip about 200 feet long was made on the motor haulageroad near No. 11 slope. Also made concrete roof on Baltimore barn and Red Ash barn.

A fireproof overcast was constructed for the return air in Hillman vein.

Outside: Constructed fireproof engine house and installed engines therein for hoisting on No. 41 slope. A six-inch bore hole was put down for this purpose. Also constructed concrete and hollow tile wash-house and lamp-house. Fences and an overhead bridge were erected opposite the wash-house and lamp-house to prevent men from crossing the mine car tracks.

MINE FOREMEN'S EXAMINATIONS

The annual examination of applicants for certificates of qualification as mine foremen and assistant mine foremen was held June 6 and 7, in the Y. M. C. A. Building, Wilkes-Barre. The Board of Examiners was composed of Thomas J. Williams, Mine Inspector, Wilkes-Barre; Samuel R. Morgan, Superintendent, Wilkes-Barre; David L. John, Miner, Wilkes-Barre; John H. Harris, Miner, Wilkes-Barre.

The following persons passed a satisfactory examination and were granted certificates:

MINE FOREMEN

Daniel W. Lewis, Miners Mills; Theophilus Davis, Jenkin Evans, Plains; Thomas S. Jones, John O'Neil, John Stainthorpe, Daniel James Thomas, Wilkes-Barre.

ASSISTANT MINE FOREMEN

Emanuel Bona, Thomas Bona, Edward Evans, Harry Ellis, Evan Jones Hughes, Enoch Jones, Taliesin Rowe, Daniel R. Roderick, Thomas Sayes, Wilkes-Barre; Daniel William Davis, Kingston; Ray P. Lewis, Daniel Francis Walsh, Miners Mills; William Morris, Parsons; Robert Richards, Edwardsville.

Prospect Colliery.—Completed No. 59 rock tunnel from Abbott to Snake Island vein; No. 26 slope in the Skidmore vein extension through fault in the Oakwood shaft; 75 degree silt pipe was laid to the water course level through fault in the Hillman vein; three diamond drill holes from the Hillman to prove the Five Foot vein, and top rock was blown across No. 13 slope basin in the Red Ash vein, in preparation for motor haulage.

Outside. A 10 inch bore hole was put down from the surface to the head of No. 5 slope in the upper Baltimore vein, the engine being changed from air to steam power.

Completed a 6 foot by 8 foot shaft from the surface to the Bowkley vein, by way of which massive concrete batteries were constructed in the Bowkley vein in the vicinity of the Mill Creek cave as an extra protection from Mill Creek water. On completion of the batteries the isolated area to the top of the shaft was silted full. Also completed a 10 foot by 10 foot shaft from the surface to the water course, in the Hillman vein, for the purpose of conveying Henry colliery boiler fuel and retail coal from the breaker to the fuel cars.

The work of silting Mill Creek cave, in Suburban park, was continued throughout the year and is nearly completed.

Installed 10 new Wilmot jigs in the breaker and completed new steel roof and ventilators on Oakwood shaft engine house.

Henry Colliery.—Completed rock extension from top to bottom Five Foot vein; No. 75 rock tunnel extension to Top Five Foot; two concrete overcasts in Wyoming Five Foot slope, and No. 42 slope was started to develop the basin north of the present workings.

Transportation on No. 28 slope was abandoned and the new No. 41 slope put in operation. A rock tunnel to tap old workings of the Lower Baltimore vein was started off No. 39 slope in the Skidmore vein.

Installed 50 sets of steel timber for roof support on No. 14 slope in the Five Foot vein.

A mine foreman's office was constructed near the foot of Red Ash shaft.

Outside. Installed shaking grates and combustion arches on 8 boilers to increase the efficiency of the plant.

A 12 inch emergency drainage bore hole was started from the surface to the Red Ash vein; completed an 8 inch bore hole from the surface to the Five Foot vein for the exhaust steam from No. 42 slope engine, also an 8 inch bore hole from surface to the Five Foot vein for the purpose of flushing dirt bank inside.

Test holes were drilled on the river flats for proving the rock cover overlying the Hillman and Five Foot veins.

MINE FOREMEN'S EXAMINATIONS

The annual examination of applicants for certificates of qualification as mine foremen and assistant mine foremen was held May 8 and 9, in the Y. M. C. A. Building, Wilkes-Barre. The Board of Examiners was composed of Thomas J. Williams, Inspector, Wilkes-Barre; Samuel R. Morgan, Superintendent, Wilkes-Barre; David L. John, Miner, Wilkes-Barre; John H. Harris, Miner, Wilkes-Barre.

The following persons passed a satisfactory examination and were granted certificates:

CONDITION OF COLLIERIES

LEHIGH AND WILKES-BARRE COAL COMPANY

Hollenback No. 2, South Wilkes-Barre No. 5 and Stanton No. 7 Collieries.—Ventilation, roads, drainage and condition as to safety, good.

LEHIGH VALLEY COAL COMPANY

Prospect and Dorrance Collieries.—Ventilation, roads, drainage and condition as to safety, good.

HUDSON COAL COMPANY

Baltimore No. 5 Colliery.—Ventilation, roads, drainage and condition as to safety, good.

RED ASH COAL COMPANY

Red Ash No. 2 Colliery.—Ventilation, roads and drainage, fair. Condition as to safety, good.

WILKES-BARRE ANTHRACITE COAL COMPANY

Hillman Vein Colliery.—Ventilation, roads, drainage and condition as to safety, good.

IMPROVEMENTS

LEHIGH AND WILKES-BARRE COAL COMPANY

Stanton No. 7 Colliery.—Completed extension of No. 3 tunnel from Ross to Red Ash vein; rock slope return from Top Red Ash to Ross vein; No. 18 rock plane from Abbott to Abbott vein; tunnel from Abbott to Abbott vein, through fault in No. 4 slope; rock plane airway from No. 15 plane to No. 28 tunnel; extension of No. 11 tunnel from Top Red Ash to Bottom Red Ash vein; No. 12 plane, Skidmore No. 16 tunnel to shaft level on No. 2 plane.

South Wilkes-Barre No. 5 Colliery.—Completed rock plane airway from Stanton to Hillman vein.

LEHIGH VALLEY COAL COMPANY

Prospect Colliery.—Installed a wooden box-car loader to replace old metallic loader. Installed a new 400-hp. Erie City boiler; also air hoist in Red Ash vein, and electric motors at foot of No. 13 slope, Red Ash vein, and on No. 5 slope, in Baltimore vein. Completed No. 60 tunnel, Midvale slope, from Hillman to Five Foot vein; No. 8 plane from Skidmore to old workings in Lower Baltimore vein, for the purpose of improving ventilation, and No. 10 slope manway, Red Ash vein.

Dorrance Colliery.—The Lance vein was opened from No. 28 tunnel. Completed No. 29 tunnel from Hillman to Bowkley vein; No. 30 tunnel from Five Foot to open up the Cooper, Bennett, Lance and