

were employing their full hands inside the mine, entirely disregarding the law in this matter: The other one, owned by the Delaware and Hudson coal and canal company, called the Pine Ridge shaft, was working according to law in this particular.

By the 22d day of August, 1870, those parties owning or working mines, having only one mode or means of ingress or egress, were duly notified to suspend operations or comply with the law, by reducing the number of persons working inside the mine at one time to 20, and to put all the force they could of this number to work for the second opening or means of ingress or egress, not confined to any number of shifts, in 24 hours.

Some operators complied with the notice, while others would have worked on had not the men refused to work under the circumstances. However, some 4 or 5 claimed that they had been driving for the second opening or means of ingress or egress; some to surface in coal which did not out-crop on their lands; others to connect with adjoining mines, and at the same time they had not even made a survey to know the distance required to be driven to make the second means of ingress or egress to their mines, but were working the mines in the best manner they could to secure work in future and to facilitate the getting of coal, irrespective of the time it would take to make a second means of ingress or egress to their mines.

Shortly after the notices were served, the parties interested held a meeting, the proceedings of which were not made public. Soon after this surveys were made by most of them, and they began in good earnest to work according to law and make the second opening or means of ingress and egress an accomplished fact, while about this time two shafts stopped altogether for the present. One of them was owned by C. S. Maltby, a small shaft, 108 feet deep, it being nearly worked out, and had a severe breakage of machinery from over-winding. They did not deem it worth while to repair the shaft and machinery, as the new mining law required so many improvements to be made for the safety of the miners employed. It is therefore abandoned until a new shaft is sunk at some future time.

The Wilkesbarre coal and iron company owned and operated the other shaft, and had commenced to work for the second mode of ingress or egress according to law, with twenty men; but after a survey had been made, the distance was found to be so great, the shaft was stopped and has not since resumed. This shaft is 340 feet deep, but has no breaker attached to the head house; the seam they worked has an out-crop on the mountain side, many hundred yards from the shaft; there is also another abandoned shaft to the west of this, where there is but 125 feet from that to 140 feet to sink through, to cut the same seam of coal with about 1,000 feet to drive through coal to connect the two passes.

#### THE PINE RIDGE SHAFT, SINGLE OPENING.

*Owned by the Delaware and Hudson Coal and Canal Company.*

This shaft is 400 feet deep, has a large breaker attached to the head house of shaft; this mine gives off a large quantity of gas or fire-damp. It has been on fire several times, but has been fortunately extinguished without much damage. They have been driving to connect with their adjoining Mill Creek mines for the purpose of a second mode of ingress or egress, but have had a rock fault to contend with, or they would have made the connection

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.

#### MALBY'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.

The firm of Wilner & Co. having failed late in the fall, Mr. Maltby has taken hold of the whole concern once more, with the intention of driving a tunnel from the small vein now being worked in the shaft to the under one. O. C. Fowler, general superintendent,

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#### MOCANAQUA COAL COMPANY'S MINES.

These mines are located near Shickshinny, and consist of three drifts. There has not been any work done in these mines during this year. These mines being situated as they are, several hundred feet above the level of the river, are easily ventilated, there being no gases to contend with; the greatest danger is met by sudden falls of pieces of the roof, which is very irregular.

*Ventilation* was produced by a small furnace, and sometimes only by natural means. A fan was in contemplation just before their stopping. A. J. Cohen, general superintendent; Z. Kreiger, mining boss.

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#### MINERAL SPRING COAL COMPANY'S MINE.

This colliery is located east of Wilkesbarre, Pa., and is bounded on the east by the Laurel run, and on the west by the Baltimore No. 3 mines. It is a slope on the Baltimore vein, split; the two veins being worked separate, which are in some places 28 feet, and in other places only a few feet apart. The top vein generates fire-damp in small quantities.

*Condition and ventilation.*—This mine is tolerably safe, roof being generally good, and not much gas to contend with. Two furnaces are in use to create ventilation, both moving a current of about 34,000 cubic feet of air per minute. Amount at face of mine, 27,000 cubic feet. Number of persons employed inside 68. There has been some improvements made in forcing more of the air through the faces of the working places than heretofore, by building stone and mortar stoppings instead of wooden ones, and other changes. A. J. Davis, Esq., successor to Mr. J. R. Davis, general superintendent; Wm. Coby, mining boss.

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#### NEW JERSEY COAL COMPANY'S MINES.

These mines are located a short distance west of Ashley borough, and consist of two collieries Nos. 1 and 2. The No. 1 colliery is located about one mile west of Ashley, and consists of one slope and one tunnel. This colliery has not been worked any during the year 1872. F. Barnes, general superintendent.

*No. 2 colliery.*—This colliery is located a little nearer the borough of Ashley, and consists of one drift opened on the Red Ash vein. There was a slope also upon the same vein, but it has been abandoned, and the coal is being taken all out the drift at present. There has been but very little work done in this mine during the year 1872, except supplying a local trade. They did not ship coal until the month of November.

*Ventilation.*—This is rather scarce and has always been so in this mine. The vein has been very irregular in parts of this mine and the work done there is much of the same character. A small furnace is being used to create circulation. Frank Barnes, general superintendent; Thos. Hughes, mining boss.

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#### NORTHERN COAL AND IRON COMPANY'S MINES.

These mines are five in number, but only four of them shipping any coal as yet.

*No. 1 shaft.*—This colliery is located a short distance east of the borough of Plymouth. It is sunk 295 feet. There are two veins being worked in this shaft—the Lance and the Cooper. The lower or Cooper bed generates a small quantity of fire-damp.

they complete the sinking of their present shafts and erecting of another breaker, which they have in contemplation, near the location of their drifts. This second breaker spoken of is intended, so stated, to prepare the coals from the Red Ash seam alone, upon which two of these drifts are opened out. Work is progressing finely in these drifts by driving gangways and opening chambers ready so as to enable them to mine quite extensively as soon as their first breaker will be completed, which will be ready early in the spring of 1876.

The two shafts above referred to have not yet penetrated the coal, having had considerable trouble in passing through the surface wash or alluvium of about 60 feet. The rock was found at the aforementioned depth, which gives them the necessary foundation for their shaft timber and a good roof for covering for their coal seam. Those shafts are located about 200 feet apart and sank simultaneously, so that not much delay will be occasioned in the time necessary to make a lawful second opening, the distance between them being so small.

The area of the mining territory of this company is stated to be about 800 acres, and very favorably located for outside arrangements.

#### MALTBY NEW CIRCULAR SHAFT.

This shaft, although commenced in 1872, has not been completed up to the present time. I stated in my previous reports that it was a circular shaft. The shaft lining, being a brick wall 21 inches through, which was let down by building continuously upon the top, its weight pressing it down as the sand and other material was taken out. The wall finally became so bound by timber pressing upon its sides that its strength was not sufficient to resist the unequal pressure upon its outside, and its cast-iron plates having broken work was discontinued for some time. During this summer Mr. A. O. Fowler, the superintendent, has changed the plan, and has had a cast-iron tube cast in whole rings in sections of about 4 feet in length, and has succeeded in putting the same inside of the brick wall and reached a depth of about 100 feet, or about 20 feet below the brick wall. A short distance below the brick wall they struck a bed of clay, perfectly dry; but this did not last long before they were surprised and driven right out by a force or pressure from below, driving the sand, clay and water up through the bottom until they had to adopt still another new apparatus called a digger, a kind of an automatic shovel, which acts exceedingly well so far as tried, as by this means they are enabled to draw up the sand and clay without taking out the water and the great weight of the cast-iron tubing, pressing it down many feet below the excavated part, thereby forming a leader or shoe. It is thought that matters looks more favorable now than at any other time from its commencement to reach the solid rock, which is at a distance of about 40 feet below their present tubing.

#### SECOND OPENINGS.

The following mines have had their second openings completed this year, to wit:

*J. H. Swoyer's Forty Fort Colliery.*—This mine has had a small shaft, 50 feet deep, sank from an overlying seam, which is intended to be used as a second opening for this mine, and also to be used for ventilating purposes, and eventually be enlarged and afterwards used for a hoisting shaft for the coals from their present seam, while that the present main or hoisting shaft will be continued down to an underlying seam, &c.

These gas-feeders have, in many cases, been extinguished, and the straw appearing unscorched and perfectly cool when taken out and examined.

In addition to the above long list of items then comes the loss of time caused by accidents occurring under this head. Whenever there is a serious accident, or a fatal case, the colliery is stopped for the day, and very often until the day after the funeral, causing the loss of from one to three days per accident to the miner and his laborer. This ought also to be added to the expense of our present system of exploding blasts.

In the above we have only reckoned the matter of dollars and cents to the miner and his laborer, which is impossible to get exactly, on account of the time required to pick out the tamping and re-touch after re-loading of the charge; also the expense of the powder lost and the value of the time lost in these various operations.

Next comes the loss of *human lives* and loss of limbs. Many of those injured must be cripples for life, and therefore are objects of public charity generally. But the matter of loss of lives is not to be calculated by dollars and cents. In order to do what we can to save the lives and limbs of those poor and unfortunate beings any system should be adopted that promises an improvement over the present. I dwell more upon this item than on any other in the whole list of accidents, the reason for which is this: I see that it is one of the heaviest items on the list, falls of roof and sides being the highest and blasts the second highest. In the second place I think that an improvement could and should be made in this department resulting in the saving of many lives that would otherwise be lost.

In the total number of lives lost in England for 1874, amounting to 1,056, thirty were attributed to blasts in various ways, equal to 2.84 per cent. of the whole number, while ours in this district for 1876 equals 18.18 per cent., nearly six times the percentage of the former. This is due no doubt from the excess of powder used in this district over what they require to use in mining the bituminous coals.

The other four deaths classed under this head occurred as follows: One by falling under a locomotive engine in the mines; one by being drowned in bottom of new shaft by falling under platform which was covered by several feet of water; one by being crushed by hoisting carriage in carriage pit at foot of shaft; a boy 12 years of age looking for employment, and one died from wounds received by being kicked by a mule.

#### ON SURFACE.

There were three lives lost under the above head. One by car on culm bank, one by railroad cars under coal breaker, one by falling into pony rollers in breaker, by carelessness, on his own part; his age being but about ten years, he probably did not comprehend the great danger incurred when disobeying the advice of men and boys around him.

#### IMPROVEMENTS.

There has been but a very limited amount of work done in this district under the above head during the year just ended. Indeed, much less than in any year since 1870.

#### SHAFT SINKING.

The Ellenwood coal company has completing one of their shafts to the coal, but a connection to the second shaft, which is intended as their second opening, is not yet effected.

The **Maltby** circular shaft, begun in 1872, has not yet been completed. The time of my last visit, during the summer, the cast iron tubing had

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.

therefrom to fall and intermingle with a current of fresh air, and be drawn into their other workings.

**ASHLEY COLLIERY FIRE.**—This colliery has been the scene of a serious fire this year, necessitating the flooding of that portion of the mine where it occurred, called No. 3 slope, being the deep workings on the Baltimore seam. This fire occurred, it is stated, from the gas igniting from a miner's lamp; he having, a short time previously, fired a blast, and on his return to the face of the gangway, where he worked in company with his laborer, the gas ignited along the roof, and all efforts towards extinguishing it failed, on their part. They then went out of the mine to report and seek assistance. In their excitement they forgot to call upon, and inform another party of men driving a gangway and air-way in an adjoining part of the same mine; and it was with great difficulty that those men made their escape, the gas affecting them so seriously that two of their number were left prostrated on the gangway, while the other two went wending their way, as best they could, to escape its deadly contact, and to send succor to their dying comrades. Fortunately they were met on the way by a fresh gang of men from the surface, and assistance rendered just in the nick of time to save the whole party, thus averting the loss of any human lives in this catastrophe. It was found that the fire had made such headway that the only way to be certain of its speedy extinguishment was in the flooding of the deep slope where the fire existed; an operation requiring some weeks of time, to say nothing of the many months of time to be taken in pumping the same out of the mine to enable them to resume mining operations again.

#### Mine Improvements.

Improvements in mining, as in other branches of business, have been very limited in 1877.

**MALTBY COLLIERY.**—C. S. Maltby has not done anything towards completing his circular shaft, but has erected a new breaker near the old shaft. North-easterly from the same, a new shaft is being sunk to be used as a second opening, pumping, and ventilating shaft, in conjunction with the old one. Also, he has driven the tunnel on the mountain side further on, and penetrated the Cooper, Bennett, and Ross seams, some of which, it is said, are in very good condition. It would appear, from the very extensive improvements going on at this colliery, that it is destined to be one of the finest on that side of the river. There is about 600,000 feet of lumber in the said new breaker, and contains, it is claimed, all the modern improvements to be found anywhere in said branch.

No other improvements of importance were done in the district during the year.

#### Second Openings.

The Conyngham shaft, Delaware and Hudson Canal Company, the Nos. 1 and 2 shafts of the Susquehanna Coal Company, are the only shafts now

**Condition of the Collieries.**

The condition of the mines in the district, generally is quite satisfactory. There are a few collieries, however, that ought to be mentioned as being below the general standard, to be found in the district, which is caused from the inefficiency or incompetency of those in charge. These parties frequently attribute the deficiencies to their superiors in office, or their employers; but I have seldom, or never found a badly arranged and badly ventilated mine where there was a person in charge who had the necessary qualifications to make things satisfactory, as such persons, generally, have stamina enough to overcome the objections raised to their plans, in a pecuniary point of view, by their employers—unless it be that the said officers, having been but a short time in charge, had not had sufficient time to make the improvements necessary. In fact, employers can mostly be convinced, by their head officers and their assistants, when properly explained, that it is cheaper to have a mine well arranged and well ventilated than otherwise. There are some exceptions to this, like other rules, no doubt. It is not only once, but many times, that the writer has heard the head officers blame those under them with having failed or neglected to carry out their wishes, and, in some instances, their positive instructions to comply with the provisions of the mining law. The following are the mines comprising the class above referred to, to wit: East Boston, Hutchison, Ellenwold, Maltby, Forty Fort tunnel, No. 5 shaft D. and H., Plymouth, Pools, Chauncey, and West Nanticoke collieries. The last named colliery is in a fair way for improvement, I believe. A new fan is about being erected at the Hutchison. Ellenwold shaft has changed ownership, which may cause improvements there. And new mine bosses are to be employed in Maltby, and several others of those mines, which may also be beneficial.

**Mines on Fire.**

**THE EMPIRE**, or Kidder slope fire is about the same as when my last report was made; parts of the surface caving in occasionally, which has to be filled up promptly.

**BALTIMORE OLD WORKINGS**.—These are burning up quite briskly, near the outcrop, for a large area, and but little hopes are entertained of ever extinguishing the fire in them until it exhausts the fuel within its boundaries at least.

**Mine Improvements.**

Improvements in mining have been very limited again, during 1878, as in 1877.

**MALTBY COLLIERY**.—Mr. Maltby had the new coal breaker started in the month of August, to prepare the coals from a tunnel on the mountain side, as, also, from a new shaft sunk during this year. The old shaft was not yet ready to do any mining in, as it was being timbered anew, besides some other improvements.

**RED ASH COAL COMPANY'S COLLIERY**.—This company has been organized to operate a small local opening, partially opened out many years ago



care and attention, this colliery ought not to be deficient of proper ventilation in the future, for some years to come, at least.

### SECOND OPENINGS.

#### The Conyngham Shaft.

Has not yet been connected, by completion of its second opening, to the No. 3 Baltimore, where it is intended to reach, work having been suspended upon it since the last spring, and nothing else done at the shaft, except the putting in of large Bull pump.

#### Maltby, No. 2, Shaft.

A second opening has been made, from the new to the old shaft. Having commenced operations of mining coal for market before the said connection had been completed, it became my duty to require them to stop all work in the new, or No. 2 shaft, except the second opening, which they did, until the connection was made.

#### Shaft No. 1, Nanticoke.

The connection between the said shaft and No. 2 slope, was completed in the upper, or Hillman seam, during the summer. But it will require a length of time to make a connection in the lower seam, now being driven in the shaft, being a part of the Big or Baltimore seam.

#### Shaft No. 2, Nanticoke.

The connection between this shaft and No. 1 slope was completed on the 22d day of February, and on the morning of the 27th, the temporary head house and pump house took fire by some means, generally supposed to have ignited from spark from passing locomotive engine, and was entirely consumed in less than three quarters of an hour. There were some fifteen or twenty persons down in the shaft at the time, all of whom immediately made their escape through the second opening, except Mr. Thomas R. Williams, the mine boss, and one other person, both of whom remained down about the foot of the shaft and around the mule stable for over an hour, when they also came out. Williams stated that at first the smoke descended the shaft, and was forced towards No. 1 slope in part, and part drawn up through up-cast to the fan. But that very soon the whole current reversed, No. 1 slope becoming the down-cast, and remained so until the most of the wood had been consumed, when it again reversed, the air and smoke passing towards No. 1 slope, until Williams made another change, by manipulation of the doors, when he and his partner ascended by way of the outlet, just in time to meet parties in search of them from the surface, fearing some wrong had happened them. Had the general inside foreman, Mr. George T. Morgans, the mine boss, Williams, and a first class set of miners not done extraordinary work in driving out the said outlet, it is more than likely that some lives would have been lost by the burning of said head house, although, as above stated, there were but few persons working there until the outlet was through.

Owing to the general destruction, enormous expense, and great loss caused by flooding mines with water, it should be the last method adopted for extinguishing fires. And even by flooding mines, there are many instances where, upon taking the water out and admitting air, the fire again ignited and burned as briskly as ever. This occurs where fires are located upon elevated grounds, having no escape for the air and gases, which as the water rises, are compressed and pent up, so that the water cannot approach the fire nor cool the surrounding strata; consequently, this space is converted into a magazine of heat, retaining a combustible temperature; and upon taking out the water and admitting fresh air, the fire instantly rekindles. This has repeatedly happened in all countries where fires occur in coal mines; therefore, in cases where a mine must be flooded, and the locality of the fire being such as to have no passages for the escape of the pent air and gases, the precaution of providing such should invariably be taken before the water is admitted. As stated before, many instances could be cited where, after flooding mines, and upon taking the water out again, the fires were found burning, and an escape for the pent gases had to be afterwards made before the fires could be effectually extinguished.

#### RECORD OF COLLIERY IMPROVEMENTS FOR 1882.

##### The Lehigh Valley Coal Company.

This company bought the Maltby colliery from Mr. C. S. Maltby, and took possession June 14, 1882. Prior to this, the sand and surface-water had broken into the No. 1 shaft, filling it up to the upper seam, causing it to be of no further practical value; and the coal seam, then opened into, in the No. 2 shaft, was exhausted. This company concluded to abandon all this, and erect substantial dams around the No. 2 shaft, and sink it to the next lower vein. By erecting these dams the large expense of pumping the water of the No. 1 shaft and all its adjoining workings was obviated. A plan of the dams was furnished by the mining boss, Mr. Thomas Lawther, which is found in this report. The perpendicular height of water which has to be sustained is about eighty feet. The No. 2 shaft is now extended to the eleven-foot seam, where they are working to effect a second opening.

##### Lehigh and Wilkes-Barre Coal Company.

In the Hollenback colliery a tunnel was driven from the Baltimore to the Hillman seam, where they found good coal, seven feet thick. The tunnel was 8x16 feet area, on a grade of 18 degrees, and is 700 feet long. They are now working to effect a second opening by connecting with the main shaft. They also sank a slope from the west gangway on the shaft level to the bottom of the synclinal, a length of 700 feet, on a grade of 10 degrees, which opens room for a convenient range of chambers.

At the Empire shaft a tunnel was driven on the level of No. 5 slope, from the Baltimore to the Red Ash seam, which was 7x12 feet area, and

end of Wilkes-Barre, within the limits of the city. The size of the hoisting shaft is 16'×11', and the area of the air-shaft is ninety-one square feet. Both are sunk to the three-foot seam, a depth of two hundred and eighty-two feet. The breaker was completed and started to work on the 25th of September, 1883. Both shafts are connected to the workings, and the ventilation is produced by a Guibal fan, sixteen feet diameter. They are working both the three-foot and Hillman seams, and both are emitting carbureted hydrogen gas very freely, which caused considerable trouble while sinking the shafts.

**The Lehigh Valley Coal Company.**

The Dorrance shaft is completed to the Hillman seam, a depth of six hundred and two feet. Two cages are already in operation to hoist from this seam, and the second opening is now being driven to connect with the air-shaft. The air-shaft is sunk to the same seam, and reached it at a depth of three hundred and thirty-four feet. Its size is twenty-five by ten feet. A new thirty-five feet Guibal fan is being erected at the top of the hoisting-shaft, a part of which shaft is to be used as an upcast. The breaker is in course of construction, and will be ready to work in a few months. It is evident from the extensive preparations that this is intended to be a large producing colliery, and will be actively at work during the latter part of 1884.

The **Maltby** shaft was sunk to the eleven-foot seam, an extension of one hundred and twenty feet, and its depth at present is two hundred and eighty-seven feet. A second opening to this seam was made by driving a passage out to the outcrop of the vein. A slope is being driven down the dip of the vein, which had reached a distance of five hundred feet at the close of the year. They intend to drive a tunnel from the bottom of this slope to the six-foot vein, to work that seam under the flats, beyond the point where the old river-wash exists. The dams erected around the shaft in the six-foot seam, described in last year's report, hold the water perfectly well, and no trouble from that source is apprehended.

**The Lehigh and Wilkes-Barre Coal Company.**

The collieries of this company have been operated under contract by Charles Parrish and Company for a number of years, but they all passed into the management of the Lehigh and Wilkes-Barre Coal Company on the first day of August, 1883. This change was regretted by a large number of people who were employed at various branches of work in those mines, and the excellent condition in which the mines were left speaks well of Mr. Parrish's management.

At the Hollenback mine, a tunnel was driven through the anticlinal existing between this and the Diamond mines. This tunnel was made for the purpose of leaving the water run from the Diamond into the Hollenback mine. The lowest portion of the Diamond workings was filled with water to extinguish a fire, as reported in my last report, and it was tapped

was erected thereon. The engine is seventy horse power, connected directly to the shaft of fan. It is used to ventilate the slope workings which were opened the year before.

The **Maltby** shaft of this company resumed operations in December, 1888, after being idle for four years.

*Delaware and Hudson Canal Company.*—This company has erected a new breaker at the Delaware shaft, located at Mill Creek. It was started to prepare and ship coal in August, 1888. It is one of the largest and best equipped, with the most improved machinery for the cleaning and preparing of coal that there is in the valley. The shaft workings are ventilated by the old twenty-foot fan that was formerly in operation at Pine Ridge shaft.

At the Laurel Run mines of this company an underground tunnel was driven from the bottom to the top split of the Baltimore seam a distance of eighty feet, likewise an air shaft to ventilate the same a depth of twenty-four feet, which will give good ventilation to this portion of the workings.

*Butler Colliery Company.*—The Mosier shaft of this company has been sunk from the Marcy to the Powder Mill seam, a distance of three hundred and eighty feet. The air shaft was sunk the year previous, so that the both shafts are now connected in the bottom seam, and the ventilation restored in the proper direction.

The Twin main and air shafts of this company have been sunk to the Powder Mill seam, a distance of two hundred and sixty-three feet. A new fan fourteen feet in diameter was erected on the air shaft, connected directly with a horizontal engine of forty horse power.

The Ravine shaft of this company was sunk to the Powder Mill seam, a distance of five hundred and seven feet, which opens up a large field of good coal for this colliery. A new fan twenty feet in diameter was erected on this shaft, connected directly by a horizontal engine of seventy-five horse power to ventilate this seam. A new air shaft was started from the surface and sunk to the Marcy seam connecting both shafts in this vein, the air shaft not having reached the Powder Mill seam yet, the second opening has not been completed in this vein. This company has likewise built a new breaker to prepare and ship the coal mined in the Twin and Ravine shafts. It is situated close to the Susquehanna river, in the borough of Pittston. It is the largest breaker in the district, and has a capacity of fifteen hundred tons of coal per day, having the latest improved machinery for the preparing of coal for market. All the machinery is covered or fenced off according to law. The coal is taken from the shafts, by two locomotives to the breaker, over a trestling one mile long.

*Hillside Coal and Iron Company.*—At the Consolidated slope a new fan was erected on a new air shaft, sunk for the purpose of ventilation. It is a closed fan twelve feet in diameter, connected with a horizontal engine by belt gearing. This slope was ventilated by a fur-

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-

## COLLIERY IMPROVEMENTS DURING THE YEAR 1892.

*Pennsylvania Coal Company.*

In Barnum No. 1 shaft, a new Guibal fan 18 feet in diameter, has been erected on the site of the one which was destroyed by the fire, which occurred on the evening of July 22, 1892. The old air-shaft of No. 2 Barnum has been enlarged from the surface to the depth of 150 feet, and a pair of double engines placed to hoist the coal through it from the 7 and 14 foot seams.

*Lehigh Valley Coal Company.*

In the Maltby shaft a rock tunnel was driven from the bottom of the 11-foot slope to the 6-foot vein, with a sectional area 7×14 feet, opening up a large territory of good coal.

*Delaware and Hudson Coal Company.*

In Laurel Run slope a rock tunnel was driven from the Checker vein to the lower Baltimore, a distance of 220 feet, with an area of 60 feet, to be used for transportation.

In the Pine Ridge shaft an air-shaft was sunk a distance of 22½ feet, from the upper to the lower Baltimore seam, to be used for ventilation.

In the Delaware shaft three rock tunnels, 8×10 feet area, were driven between the lower and upper Baltimore seams a distance of 40 feet each, to be used for transporting coal, and a new gravity plane was completed, 400 feet long, 8×10 area, with a gradient of 12°.

*Butler Mine Company, Limited.*

In the Fernwood shaft an inside slope was sunk a distance of 325 feet in the red-ash seam. A new Guibal fan, 12 feet in diameter, was also erected on the second opening to ventilate the workings, exhausting 22,000 cubic feet of air per minute with a water gauge of 3 inches, working speed of 35 revolutions per minute, driven by a horizontal engine, cylinder 10×24 inches.

In the Chapman shaft the second opening has been completed 130 feet in depth, with an area of 10×12 feet. A new fan, 12 feet in diameter, has been placed thereon to ventilate the workings, exhausting 30,000 cubic feet of air, with a water gauge of 2 inches, running 45 revolutions per minute. The fan is driven by a 20-horse power horizontal engine, cylinder 10×30 inches.

*Newton Coal Company.*

On the twin shaft a large pair of first motion engines were erected in place of the ones which were destroyed by the fire of September 11, 1892. They were built by the Dixon Manufacturing Company, Wilkes-Barre.

A rock tunnel was driven through an anticlinal from the bottom of the shaft in the Red Ash seam, a distance of 300 feet with an area of 7×16 feet which greatly shortens the transportation of coal to the foot of shaft.

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.

coal trade, which has been such as to cause considerable distress and suffering among the toilers of the mines. On an average the breakers of this district worked only a few days over half time for the year. The miners in many instances do not make a day's work when the breaker does by reason of not getting sufficient cars to load their coal. There are several reasons for this, the principal one being the overcrowding of the collieries with miners, especially in the collieries where the coal seams are low and of an inferior quality. Then, again, delays are caused by unavoidable breaking of some part of the machinery in the breakers, which causes a delay of from an hour to two or more, as the case may be; all of which has a tendency to shorten the hours of work for the miner.

#### The Burning of the Maltby Breaker.

On April 2, 1897, the Maltby breaker of the Lehigh Valley Coal Company, located at Maltby, was discovered to be on fire. Strenuous efforts were made to save the structure, but they were of no avail. It was completely destroyed, with all the machinery, in a few hours.

A new breaker has been erected on the site of the old one, which started to prepare and ship coal on Saturday, July 17. This is the quickest work on record, as the plans had to be drawn and lumber and machinery provided. The structure was completed in 106 days.

#### The Burning of the Hunt Breaker.

The Hunt breaker, located at Maltby, and owned by the D., L. & W. R. R. Company, and leased to the Wyoming Coal and Land Company, in June, 1895, was totally destroyed by fire early on Friday morning, May 28, which caused a suspension of the mine until a breaker could be built on the company's land close to the mine opening. The new breaker was commenced on August 7, and commenced to prepare and ship coal in December, 1897. The capacity is 800 tons per day and the breaker is so arranged that the coal from the pockets can be drawn into the cars on two separate tracks under the breaker. A new branch of the Lehigh Valley Railroad was constructed from their main line to the breaker, a distance of a mile, on which company's road the coal will be shipped to market.

#### Colliery Improvements for 1897.

Lehigh Valley Coal Company.—The Henry hoisting shaft was re-timbered from the rock to the surface, 83 feet, with the best 12x12 yellow pine timber. New buntons and guides were also put in, which puts the mine in first class condition.

At the Maltby colliery two new horizontal tubular boilers of 150 horse power each were erected at the shaft, and the old cylinder boiler



ers at the breaker were abandoned. In the mine an additional intake air-course was driven in the eleven-foot seam and the return air course enlarged, which increased the volume of air in the six-foot vein from 85,000 cubic feet to 145,000 cubic feet per minute.

Pennsylvania Coal Company.—The No. 6 shaft was enlarged from 10x16 feet to 10x31 feet to make room for two hoist-ways a pump-way and an air-way from the surface to the Pittston seam, a distance of 312 feet, which shaft was then continued down to the Red Ash vein 300 feet. The location for a new breaker has been staked out to be built in the spring of 1898, which will prepare the coal from shafts Nos. 5, 6 and 11.

At No. 4 shaft of this company three new Babcock and Wilcox water tube boilers of 150 horse power each were erected, which take the place of twelve cylindrical boilers formerly used. Also at the Ewen breaker six Babcock and Wilcox boilers were erected and put in operation on February 13, 1897, which supply steam to the breaker, and to No. 7 and Hoyte shafts, supplanting the 27 cylindrical boilers previously used.

Forty Fort Coal Company.—At the Harry E., a new pair of First motion engines have been placed on the head of the inside slope in the Red Ash seam. Diameter of cylinders 30 inches, length of stroke 48 inches. The drum shaft is 14 inches in diameter and made of steel, length being 28½ feet. There will be 8,000 feet of one and one-half inch rope on the drum; 15 cars will be hoisted on a trip.

Raub Coal Company.—At the Louise Colliery an addition of 36 feet was built to the breaker and new machinery placed in position, thereby increasing the capacity of the breaker to 800 tons per day. New openings have been driven from the surface to the Ross and Red Ash seams by tunnels on the property lately acquired by the company. A small locomotive takes the coal from these openings to the breaker, a distance of one mile.

At 5 P. M., March 1, 1897, a settling of the surface was discovered on the east side of Eighth street, in the borough of Wyoming, Pa., which caused considerable anxiety to the people who resided in that vicinity. Realizing that the workings of the Pittston seam of the Mount Lookout Colliery had extended under that portion of the town, word was sent to notify William A. Thomas, the inside foreman of the colliery, of the fact. He immediately descended the shaft to make an investigation of the mine. On reaching the foot he encountered a rush of sand and water coming through the rock tunnel. Knowing the danger of being caught by the rush, he retreated to the foot of the shaft and was hoisted to the surface again. The mine had stopped work that day at 3 P. M., and all the men had come out some time before the rush took place. Therefore, the officials did not attempt to go down again for one hour. When the

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.

During the year connection has been made through the Barrier pillar between the Henry and Wyoming collieries in the Baltimore vein, so that each shaft will act as a second opening for the other colliery in case of an emergency.

The old Mountain tunnel of the Maltby colliery was reopened in 1900, and during the year a second opening, which is a tunnel on an elevation of about 200 feet vertically lower than the Mountain tunnel, was driven from the Four Foot vein which cut all of the veins developed by the Mountain tunnel, a distance of 593 feet, at which point work was stopped, it not yet having reached the Red Ash vein.

#### Examination of Mine Foremen.

The annual examination of applicants for certificates of qualification for mine foreman and assistant mine foreman was held in this district on the 4th, 5th and 6th of June, 1901, at the rooms of Y. M. C. A., Pittston, Pa. The board of examiners was, H. McDonald, Mine Inspector; J. L. Carke, superintendent and John J. Morahan and David P. Williams, miners. Twenty applicants for mine foreman certificates were examined, and the follownig named were recommended to the Secretary of Internal Affairs for certificates: Henry Campbell and Oscar Alpaugh, of Pittston; Joseph F. Routledge Inkerman, Seward Putton, Anthony J. Healey, Wm. J. Kane, John F. Gilhooly and George A. Davies, of Avoca; John McCutcheon, Old Forge; James Frail, Coalridge; David S. Morris, Luzerne borough; Robert C. Wallace, Parsons, and Wm. E. Johnson, Bernice.

The following named received certificates of qualification for assistant mine foreman: John V. James, Henry H. Hughes and Chas. Pyne, Wyoming; John T. O. Boyle, Thos. H. Barrett, Maltby; Archie Ramage, Gwilym Evans, Chas. M. Williams, Christian Henzelmann, John Grubitz, Andro Sholtis, John H. King, Michael J. Egan, Pittston; John E. Earley, John J. Moore, Wm. J. Morgan, Walter J. Hutchings, Ebenezer Davis, Daniel J. Thomas, and John P. Mitchell, Avoca; Wm. Pattison, Ridgewood; Jas. J. Boyle, David J. Thomas, Plains; Wm. A. Piper, Edward J. Carlin, Luzerne; Wm. Gardner, Albert Harris, Parsons; Henry Nothoff, Wilkes-Barre, and Lewis S. Smith, Plainsville.

**Inside.**—In the 11 foot they are extending the slope towards basin, size of slope 12x7. Ross vein they have reopened and extending slope towards basin, they are also extending plane which is in direct line with the slope. Size 12x7 feet. Have driven new tunnel from 6 foot to 4 foot vein, size of tunnel 12x7 feet. Have built a new traveling way separate and independent from the slope.

**Inside.**—Have built an additional airway (outlet) from 6 feet to 11 feet, size 10x6, which has made a very decided improvement in the ventilation.

#### Mt. Lookout Colliery

**Outside.**—Put in breaker, four (4) sets of Reading jigs, and rearranged 6 sets of Christ jigs. Fuel conveyer from breaker to boiler room.

**Inside.**—Driving new slope from Pittston vein to Marcy (called No. 7 slope). One electric locomotive,  $7\frac{1}{2}$  ton, for work in chambers.

### LEHIGH VALLEY COAL COMPANY

#### Maltby Colliery

A new brick boiler house, 120x5 has been constructed. Six sets, 300 H. P. each, or 1,800 H. P., B. & W. boilers are in course of installation. A number of additions and repairs have been made to the breaker, also betterments to the inside pumping capacity, and changes at the foot of the main hoisting shaft.

#### Exeter Colliery

A brick boiler house is under construction, and 300 H. P., B. & W. water tube boilers are being installed therein.

A new compressed air motor haulage plant is under construction for the Red Ash shaft district. A brick house encloses a Norwalk three stage compressor, size  $20 \times 24 \times 14\frac{1}{2} \times 11\frac{1}{2} \times 5 \times 24$ . A 15 ton air locomotive is on the ground. A six inch air pipe runs from the surface down the shaft to the inside haulage roads, total length of pipe, 3,700 feet. These roads are laid with 40-pound rails and special care has been given to the alignment and grading; in all, very favorable conditions now exist for a satisfactory haulage plant at this place.

New barns have been built in the Checker and Red Ash districts.

Pittston hoisting shaft and second outlet shaft completed from Pittston vein to Marcy vein.

New Jeanesville compound duplex pump, size  $20 \times 38 \times 10 \times 18$ , with

ton air locomotives which feed from the face of the chambers to main passing branches.

Permanent air bridges of brick and cement in Red Ash.

A new 20 foot Guibal double intake fan driven by 18x20 inch Corliss engine; brick house is under construction at Red Ash second opening.

New 10 inch steam line, 1,200 feet long, to Red Ash shaft hoist engine.

One hundred new mine cars.

Eighteen degree rock plane completed from Red Ash to Babylon vein, 110 feet.

A series of surface test holes continued to determine safe rock cover over Checker vein.

Extensive repairs made to breaker and washery.

**Maltby** Colliery.—Finished construction of new brick boiler house, and complete installation of 1,800 H. P. Babcock & Wilcox water tube boilers. The plant is in every way up to date. Equipped with force draught fan, duplicate feed pumps, Cochran water heater, utilizing exhaust from surrounding engines, fire proof, ashes washed into mines, rope conveyors bringing fuel from breaker. This new plant displaces 18 cylinder and 7 return tubular boilers.

Addition built to breaker, and new shakers displace revolving screens on Buck, Rice and Barley.

New conveyor lines on Rice and Buckwheat.

New mechanical pickers.

Extensive repairs and renewals to breaker frame.

New concrete fire house, and emergency water lines. Lehigh Valley Collieries have trained, well-equipped fire companies.

No. 9 tunnel water level, driven 790 feet, and No. 16 tunnel, driven 525 feet from surface to Red Ash vein, and surface road 1,200 feet long connecting same completed to chain haulage system.

No. 12 tunnel from Ross to Red Ash completed, 150 feet.

One hundred new mine cars.

#### KINGSTON COAL COMPANY

No. 4 Colliery—Have erected one 175 K. W. direct connected generator 250 volts; one pair 24x48 inch first motion slope engines, with two friction drums for use by bore holes upon Red Ash and Ross slopes (not yet in operation); one boiler plant (not yet in operation), consisting of 4 sets Babcock and Wilcox boilers, 300 H. P. each; one brick oil house.

They have added machinery and spiral pickers in breaker, which is a decided improvement in the preparation.

Inside

Have placed one Goyne duplex compound pump 16x28 inch and

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## RANDALL AND SHAAD COAL COMPANY

Colliery.—Ventilation bad. Roads and drainage good. Condition as to safety good.

O'Boyle and Foy Mining Company have erected a new breaker and sunk and opened up two shafts, one for a hoisting shaft and the other for an air-shaft, or second opening. They have not shipped any coal so far but intend to operate early in the spring of 1906. This breaker will have a capacity of from 800 to 1,000 tons per day when in full operation.

## IMPROVEMENTS

## LEHIGH VALLEY COAL COMPANY

Exeter Colliery.—Completed installation of 20 foot Guibal, double intake fan driven by 18x20 inch Corliss engine. Brick house for same.

New wash house equipped with 100 lockers.

Three hundred H. P. B. and W. water tube boiler and brick house.

New inside barn in Marcey vein.

A series of surface test holes to determine safe rock cover working limit over Checker vein.

Bore holes and extension of silt lines in Checker vein.

The breaker has been equipped with new mechanical pickers.

New cage on second opening Red Ash.

**Maltby** Co'liery.—No. 9 Rock slope, 600 feet long completed.

Surface road 1,200 feet long completed between shaft and No. 9 tunnel.

New brick stable for 60 mules, concrete harness house and mule hospital.

Three permanent concrete over casts are being constructed in Marcey vein.

New Duplex 30x10x36 pump placed at foot of shaft and 10 inch column pipe up shaft to surface.

A centrifugal pumping plant is under construction, including 175 K. W. 500 volt generator with engine for same.

One 12 inch bore hole for pump discharge.

Five thousand feet length of wiring from generator to pump.

New pump house at foot of Marcey vein haulage way.

Extensive repairs continued to breaker.

New shakers installed, also additional pickers.

Bore hole and pipe line for silting in Six Foot and Marcey veins.

Westmoreland Colliery.—This colliery was purchased from the Wyoming Coal and Land Company and came into possession of the Lehigh Valley Coal Company March 1. Immediately after its purchase an exchange was entered into between the Lehigh Valley Coal Company and the Pennsylvania Coal Company for the Monument farm tract, and slopes are being sunk through the barrier pillars in the Marcey and Pittston Veins.

A series of test holes has been and will be continued to prove the safe working rock cover over the Pittston vein.

A rock slope 300 feet long has been sunk from the Marcey to the Ross vein.

Two tunnels have been driven in water level from Ross to top split of Red Ash.

New fuel conveyor lines have been installed between the washery and the boiler house.

The conveyor between the breaker and the washery entirely rebuilt. Condition of colliery is good.

Westmoreland Colliery.—Series of test holes have been continued to prove the safe working rock cover over the Pittston vein.

Finished the installation of 300 H. P. Stirling boilers.

Enclosed the concrete house with corrugated iron roofing.

A new duplex pump 26x10x36, has been installed in the Marcy vein, discharging through a 10 inch column bore hole to the surface.

Steam and exhaust bore holes were completed from surface to the centrifugal pump station.

Drainage bore holes completed from Pittston to Marcy vein.

A new rope hole from surface to Pittston vein No. 1 inside slope with hoist engine on the surface.

The No. 1 Pittston vein inside slope has been extended 2,000 feet.

Number 5 Slope inside Pittston vein extended 800 feet.

Number 3 Marcy vein slope extended 1,200 feet.

Number 4 Slope Marcy vein extended 1,200 feet.

New mechanical pickers installed in breaker.

Rope hole is under construction from surface to Marcy vein.

Engines to be placed on the surface and removed from inside.

Considerable attention has been given to regrading the slopes and laying them with 40 pound rails.

New batteries and ventilating walls constructed, and roads given thorough attention to bring the colliery up to an efficient standard.

A new rope haulage engine installed on surface between foot of breaker plane and inside slope. The condition of the colliery is fair.

**Maltby** Colliery.—Three permanent concrete overcasts finished in Marcy vein.

Finished the installation of new centrifugal pump plant 175 K. W. with 500 volt generator with engine for same.

New bore hole and pipe line for silting in 6 foot and Marcy veins, location of bore hole being at foot of breaker.

Silting has been extensively carried on at this colliery during the past year in the Marcy vein.

A new head frame is under construction for the No. 2 Main Hoist shaft.

New conical drums were placed on hoisting engine.

Concrete lamp house for inside foreman's office.

A series of diamond drill holes were bored through the pillar in the No. 2 shaft to test the level of the standing water in the old Maltby 6 foot vein, with a view of tapping the standing water and bringing all the water to the central pump station at the foot of the No. 2 shaft.

The storm of October 27 did considerable damage at this colliery, blowing down all the stacks, the boiler fuel conveyor and a large portion of the steam lines. Repairs, however, were quickly made, and little time was lost in the operation of the mine. The condition of the colliery is good.

#### CLEAR SPRING COAL COMPANY

There were no particular improvements made at this colliery during the year. The general condition of the colliery is good.

A new 3-stage Norwalk high pressure air compressor, 600 cubic feet capacity, was installed in a brick building erected east of the boiler house. A new tower was erected over the Knight shaft. Washery walls rebuilt, jigs renewed; and washery was given a general overhauling.

Installed dust exhaust fan at breaker.

Constructed a 75,000 gallon capacity colliery emergency reservoir.

Westmoreland Colliery.—A new second opening plane had been driven for a manway from the Marcy to the Pittston vein; also a tunnel through the fault in the Pittston vein for a manway.

Electric haulage has been installed in the Marcy and Pittston veins with great success. A concrete and steel over-cast was built in Marcy vein.

Several drainage bore holes have been driven from Pittston to Marcy veins to drain water to the central pumping plant. Silting is being successfully done in the old workings of the Marcy vein.

Maltby Colliery.—Two drainage holes have been driven from Baltimore to Six Foot vein. Old cribbing in No. 1 Shaft was renewed. Steel roof supports are about to be placed at foot of No. 2 Shaft.

A new 800 gallon electric-driven pump was placed in west No. 4 lift, and main return airways have been enlarged generally through the mines.

The old Six Foot gangways are being reopened to connect with Hunt shaft workings.

Seneca Colliery.—A new pumping plant was installed in the Marcy vein at the basin. A Jeansville Duplex pump, size 28 x 12 inches, fed by steam dropped from surface through new bore hole, lifts 2,000,000 gallons of water per day through a 16 inch bore hole lined with 12 inch terra cotta pipe cemented, a height of 275 feet, to the surface, where it discharges near the west bank of the Lackawanna river and flows to the river. This improvement over numerous local pumps and drainage holes, with the main pumping station in the Bottom or Sixth vein, has proven satisfactory.

No. 6 Slope in the Bottom Marcy vein has been graded through the dividing rock and top Marcy vein, so as to connect the head with main motor road, thus reducing the haul between head of slope and the shaft 2,500 feet. This slope extends to No. 11 tunnel, driven through the main fault, and is operated by 12 x 16 inch engines with tandem drums and tail rope.

At the Sixth vein landing of the shaft a concrete arch has been built and all timbers removed. This affords ample room to work and has stopped the flow of water previously known.

No. 12 Rock Slope has been sunk from the Marcy vein to the Clark vein, which will develop the Clark vein at a lower level and west of the present Clark vein workings at Phoenix.

The Phoenix Shaft was concreted from the rock, thus replacing the old cribbing. These concrete walls were built to a height of six and one-half feet above the ground, thus replacing the wooden fence that previously enclosed the shaft and making any inflow of water impossible.

William A. Colliery.—At William A. Colliery, in the Red Ash vein, the method of pumping is being changed to handle the water while robbing the pillars at the foot of No. 3 Slope or at the southern corner of the Flagg-Drake property. A Jeansville pump, size 22 x 18 x 10 inches, has been placed on the lower gangway off No. 3 Slope



## IMPROVEMENTS

## LEHIGH VALLEY COAL COMPANY

**Maltby** Colliery—Outside.—A new 8-inch silt bore hole from the surface to the Marcy vein was completed. The old 8-inch silt bore hole was reopened and recased. Considerable repairs and changes were made to breaker. The Rock plane was considerably improved and extended.

**Maltby**—Inside.—The work of reopening and cleaning the main intake and return air course in the Marcy vein was completed. Electric haulage has been installed in No. 4 lift in the Marcy vein, and also at the head of No. 6 plane in the Six Foot vein. A new slope has been started to the east off main tail rope slope. Preparations are under way for a new rock slope from the Six Foot to the Marcy vein in the River district. Diamond drill driving, to locate old plane and flooded districts, was continued.

**Westmoreland** Colliery—Outside.—Extensive repairs to breaker. A new breaker with a self-acting Barney equipment completed. A new breaker plane hoisting engine was completed. An 8-inch silt bore hole from the surface to the Six Foot vein was reopened and recased. A series of test holes to prove rock cover in the Pittston vein were driven.

**Westmoreland**—Inside.—In the Six Foot vein a Y slope on the south side of the Mt. Lookout anticlinal was completed and equipped with an electric hoist. Electric haulage was extended between the foot of No. 1 slope and No. 2 plane. A new electric pump was installed in New Slope district, in the Six Foot vein. A rock manway was driven through the fault near the foot of No. 1 slope; also a rock manway from the Marcy to the Pittston vein on the tunnel level was completed. A 4-inch drainage bore hole from the Pittston to the Marcy vein was completed. In the Marcy vein a new electric pump was installed in No. 3 slope district, and a 11 degree rock plane started from the Marcy to the Pittston. Electric haulage was extended to No. 2 slope district. A concrete-steel overcast was completed in No. 3 slope district.

**Exeter** Colliery—Outside.—Extensive repairs were made to breaker. A concrete foundation and installation of new jigs in the washery were completed. The conveyor trestling between the breaker and the washery was entirely rebuilt. High pressure air compressor at the Red Ash shaft was removed to the new compressor house east of the boiler plant. A concrete air conduit for the new Blower system for the boilers was constructed. An 8-inch bore hole from the surface to the Checker vein for the breaker refuse silt, was completed, and preparations for the installation of a Jeffrey's crusher were made. The electric light system on the surface and in the mines was extended. Considerable changes to locomotive tracks were made.

## EAST BOSTON COAL COMPANY

East Boston.—Ventilation and drainage fair, condition as to safety good.

## PLYMOUTH COAL COMPANY

Black Diamond.—Ventilation, drainage and general condition as to safety fair.

## RAUB COAL COMPANY

Louise.—Ventilation, drainage and condition as to safety fair.

## CLEAR SPRING COAL COMPANY

Clear Spring.—Ventilation, drainage and condition as to safety good.

## DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Pettebone.—Ventilation, drainage and condition as to safety good.

## TROY COAL COMPANY

Troy.—Ventilation poor in some places; drainage and general condition as to safety fair.

## IMPROVEMENTS

## LEHIGH VALLEY COAL COMPANY

**Maltby** Colliery.—Outside: Repairs were made to the breaker, consisting of new timbers placed under jigs and pockets. The rock plane was extended and repairs made to the engine, which was moved to a higher location on the mountain. An 8 inch pipe was driven from the surface to the rock to seal water tapped in an old test bore hole cutting the Eleven Foot vein. The water was successfully shut off by pumping cement up the hole from the inside. A series of test holes were drilled on the flats in the vicinity of the D., L. and W. Railroad to determine the rock cover limit for the Six Foot vein. The dynamo room was enlarged, location of one dynamo changed and the switch board improved. A new fire alarm system was installed. A 12 by 15 inch terra cotta pipe line was laid from the turbine pump discharge bore hole to the creek, and Reillay's Lane was graded at its intersection with Wyoming Avenue.

Inside: Two new electric motors were installed, one in No. 4 lift, in the Eleven Foot vein, and the other in Six Foot vein at the head of No. 6 plane. One small Duplex electric pump was placed in the Six Foot vein near the head of No. 8 rock slope. One new pump was placed at the foot of the main slope. A rock slope, 530 feet long on 15 degrees, sunk from Six Foot vein to the Eleven Foot vein, to develop coal in river district. One diamond drill hole put down from Eleven Foot to prove Nine Foot. One diamond drill hole put up from Eleven Foot to locate old rock plane, to Six Foot to determine elevation and pressure of water in same. Gangways are being driven in the Four Foot vein for the purpose of dropping Maltby water to Henry Skidmore by means of bore hole. A number of new gangways were driven in the Eleven Foot vein to improve haulage.

The slant slope mentioned in the last report was extended. A concrete dam was built for turbine sump. A Jeanesville pump was installed at the foot of shaft to replace the old Griscom pump removed. Steel timbers put in on east and west side of the shaft, and steel girders at the foot of the same.

Arched roof consisting of high-rib and concrete put in to support roof between steel timbers. New concrete office for fire bosses and electricians completed near the foot of shaft in Marcy vein. General repairs made in the barn.

Westmoreland Colliery.—Outside: Extensive repairs made to breaker, consisting of new pockets and chutes and steam heating system. Six L. V. jigs were installed. Test holes to prove rock cover from Pittston vein progressing on last report were continued in the territory between Wyoming Avenue and the river and the work is now completed. Fire alarm system installed.

Inside: One small electric triplex pump installed in Marcy vein, No. 3 slope. No. 3 slope, Marcy vein, extended to Mt. Lookout anticlinal. Two diamond drill holes put down Pittston vein to prove Marcy vein south of Mt. Lookout anticlinal, and plans completed for driving tunnel through said anticlinal. 280 feet of grading, 180 feet of tunnel, and 320 feet of plane on 11 degrees completed from Marcy to Pittston vein, for dropping the latter coal to the Marcy vein. New road was driven through the old workings in the Pittston vein to mine virgin coal in northeast corner of property. Main haulage road in Pittston vein south of Mt. Lookout anticlinal graded for motor. Electric haulage system was extended. Inside bore holes put down from Marcy to Red Ash to prove veins.

Exeter Colliery.—Outside: Series of test holes were put down to prove Checker vein on the east end of the property beyond the fault. Concrete side-walk was laid in Exeter borough along the west side of Wyoming Avenue and drainage connections made with the Exeter borough sewer. New cage was put in Knight shaft. Old engines were replaced with 12 by 12 Clark and fan hoist repaired. An additional locomotive was installed. Fire alarm system installed. Extensive repairs were made in the breaker. Changes were made in the washery and two L. V. jigs added for egg coal. Building formerly used for compressor house equipped for housing locomotives.

Inside: A new concrete pump room mentioned in the last report, constructed in the Pittston vein and a 24 by 39 by 16 by 48 Goyne pump installed. The Marcy vein barn was enlarged. Old timber stalls are gradually being replaced with concrete, fourteen of which have been completed. 10 by 12 Flory engine placed in Checker vein and roads laid to develop northwest section. No. 8 slope, Marcy vein, extended. No. 4 plane workings in Top Red Ash vein connected with Nos. 5 and 6 plane workings. Work was commenced on the installation of a balance plane in Bottom Red Ash vein. A 7½ ton air locomotive added to present equipment in Red Ash vein. Work commenced in Marcy vein for installation of an air motor for haulage mentioned in last report was continued and is nearly completed.

William A. Colliery.—A new balance plane, 900 feet long, was laid outside at Campbell's Ledge, and a drift driven into the Marcy vein.

**Maltby Colliery.**—Inside: No. 7 slant slope was extended in the Marcy vein. A 30-degree rock plane, 206 feet long, was driven from the Eleven Foot to the Six Foot, as a second opening to the No. 8 slope, mentioned in last year's report. No. 9 slope in the Marcy vein was extended and graded. No. 10 slope was driven in the Six Foot. No. 11 slope in the Marcy vein was started. Three small single drum electric hoists were installed, also two 8-inch by 9-inch electric triplex pumps. Plans were completed for a 30-degree rock plane from the Ross vein to the Nine Foot vein, No. 6 slope. A new balance plane was insfalled in the Six Foot vein, river district, which released one motor taken to the Eleven Foot. The reopening of roads in the Eleven-Foot, Six-Foot and Four-Foot veins was started to rob pillars northwest of the shaft. A 4-inch bore hole was drilled from surface to the old plane, which broke into the sand years ago, and cement was pumped through this hole in the hope of sealing off this plane. It is intended to carry on this work by drilling more holes to fill, if possible, the old plane with cement. New roads were driven in the Marcy vein and the electric haulage extended so as to concentrate the coal east of the slope to one lift. The mule barn in the Marcy vein is being reconstructed of concrete to make it fireproof.

Outside: Drilling operations were carried on in the river district to prove the Four-Foot vein rock cover. New engines were installed on the head of the outside refuse plane to handle breaker refuse and hoist coal from the Four-Foot slope. Extensive repairs were made in the breaker and new rolls were put in. The colliery fence was extended. Feed water regulators were installed at the boiler plant. One Welch overwinding device was installed in the shaft engine house.

**William A. Colliery.**—Inside: The following planes have been driven and put in operation: One 500 feet long in the Clark vein; one 800 feet long in the Marcy vein; and one 1,800 feet long in the Fifth vein. These planes are operated by engines located on the surface.

Outside: A conveyor 270 feet long, was built to handle ashes from boiler house. A new boiler house was erected at Campbells Ledge, containing two 72-inch by 18-foot boilers, to provide steam for engines on Marcy, Clark and Red Ash Planes. Two engines (one 13 by 18 inches and one 14 by 18 inches), were installed, and two rope holes put down, one to Marcy vein and another to Clark vein. A 14 by 18-inch two-drum engine was installed and rope hole put down to Red Ash vein.

**Westmoreland Colliery.**—Inside: The main haulage road in the Pittston vein, south of the Mt. Lookout anticlinal was extended. No. 7 tunnel, 250 feet long, was driven through the fault in the Marcy vein to mine the coal south of the Mt. Lookout anticlinal. In addition to this 220 feet of bottom rock was blown on the motor road outside of this tunnel. No. 4 rock plane, 63 feet long, was also driven through the fault as a second opening to the tunnel mentioned above. The foot of the main slope in the Marcy vein was graded to facilitate the handling of loaded and empty cars. Work was also commenced to reopen the old gangways at the head of Six-Foot slope to rob pillars east and west of the slope. One new 7-inch by 9-inch triplex electric pump was installed in the Six-Foot vein. The main tunnel was ex-

plane. An additional 10-ton compressed air motor was installed in Checker vein. Ten additional concrete stalls were added to the mule barn in Checker vein.

Outside: The erection of the 463 horse power Sterling boiler mentioned in last year's report was completed and work commenced on an additional 463 horse power Sterling boiler. An 8-inch bore hole was drilled from surface to Red Ash vein to be used for slushing ashes from the boiler house. A 10-inch bore hole was drilled from surface to the Red Ash vein for silting purposes. New drums were put on the Pittston Shaft hoisting engines, and Welch overwinding devices were installed on both the Pittston and Marcy shaft hoisting engines.

**Maltby** Colliery.—Inside: No. 8 rock plane, 230 feet long, was driven on a 30-degree pitch from Ross vein to Nine Foot vein, No. 6 slope, to be used for a second opening. Completed Marcy vein mule barn, which is built of concrete and is fireproof throughout.

Outside: The wooden cribbing in the intake and return air shafts was removed and replaced with concrete. Extensive repairs were made to the main timbers in the breaker and 3 additional Lehigh Valley jigs installed.

William A. Colliery.—Inside: No. 24 slope was driven a distance of 1,000 feet and connection made to the Phoenix old workings north of the fault in the Fifth vein. Electric haulage in Middle Red Ash vein was extended about 3,200 feet. An air shaft was put down to Clarke vein at No. 10 tunnel, to be used as a second opening for this vein.

Outside: On August 25, the engine house at No. 10 tunnel was destroyed by fire. It has been replaced with a fireproof building of tile. The 6-foot diameter fan at No. 10 tunnel has been replaced by an 8-foot fan. A Welch overwinding device was installed on the shaft hoisting engines at William A. shaft.

Seneca Colliery.—Inside: No. 15 rock tunnel was driven through the anticlinal 280 feet long for a second opening. No. 8 rock plane, 68 feet long, was driven from Clarke vein to Marcy vein for a second opening. No. 15 slope, Marcy vein, was graded through the anticlinal a distance of 52 feet and steel timber put in for roof support.

Outside: On June 28, the two 20-foot ventilating fans at the Twin shaft were destroyed by fire. These fans have been replaced with a 24-foot steel fan of the Guibal type, propelled by an 18 by 30 inch 4 valve rotary Vulcan engine, in a fireproof building of concrete and steel. The 3,000 horse power boiler plant mentioned in last year's report was completed. It contains 6 batteries of 2 drum Sterling boilers, each battery having a capacity of 501 horse power. The engine room contains one 4,000 horse power Cochran heater, two 7 by 12 inch Goyne feed water pumps, and a 12-foot Sturtevant blast fan, propelled by a 16 by 18 inch Vulcan engine; the building, 28 feet by 183 feet 6 inches, is constructed of brick with a steel roof. An electric driven conveyor line of steel construction was built from the breaker to the new boiler house to supply boiler fuel. A concrete subway was constructed under the main line of the Lehigh Valley Railroad at Coxey shaft to provide a safe traveling way for men who are employed in and about the breaker. The old power house at Coxey shaft was torn down and replaced with a building of tile construction. An additional equipment was also installed

**Maltby Colliery.**—Inside: A rock tunnel 130 feet long was driven from the Bottom Ross vein to the Red Ash vein in No. 5 slope workings. A 300 gallon triplex electric plunger pump was installed in No. 8 slope in a concrete pump room. Silting was commenced in the Six Foot vein.

Outside: Installed 9 Lehigh Valley four-foot jigs and rebuilt pockets in east side of breaker. Drilled a 12-inch bore hole to Marcy vein for silting purposes. Erected fireproof hospital, saw house and scale house. No. 2 fan shaft was concreted and No. 1 fan house made fireproof.

**Seneca Colliery.**—Inside: Installed one 500-gallon triplex electric pump in Clark vein, one 16½ by 26 by 36 inch Duplex Jeanesville pump in No. 5 slope, Marcy vein, and a simple pump in the same pump room was compounded. Both pumps are equipped with condensers. Drilled a 17-inch bore hole from surface to Marcy vein. 160 diamond drill test holes were put down to ascertain the rock cover over the Pittston, Marcy and Red Ash veins.

Outside: Built hospital and locomotive house of brick and tile west of breaker.

**William A. Colliery.**—Inside: Built a medical room of concrete at No. 10 tunnel and completed an additional air shaft from surface to Marcy vein at this opening.

Outside: Built head frame over the tender shaft, and placed new cribbing in Babylon air shaft. Foreman's office was converted into a hospital. A new office is being constructed. Built tile and concrete locomotive house at No. 10 tunnel.

**Westmoreland Colliery.**—Inside: Installed a 150-gallon horizontal triplex electric pump in the Pittston vein.

Outside: Built hospital of hollow tile. Made roof of boiler house fireproof. Two diamond drill holes were put down to the Pittston vein from the surface and extensive repairs were made to the breaker.

#### KINGSTON COAL COMPANY

**Kingston No. 4 Colliery.**—Outside: Installed a double intake 8 by 25 foot ventilating fan at No. 4 shaft, driven by 18 by 30 inch direct connected Corliss engine. The fan house and approach to the shaft are made of concrete and steel. The Bennett and Orchard fan engines at No. 2 bore hole were equipped with new 18 by 20 inch Corliss valve engines. Completed 12-inch concrete steel partition in the airway compartment of No. 4 shaft, from the Red Ash to the Bennett vein, and the old brattice in that section was removed. Drilled an eight-inch bore hole from surface to Bennett vein, 330 feet, for pumping purposes. No. 4 breaker engine was replaced by a cross compound Lentz engine, 19½ inch high pressure and 32½ inch low pressure cylinders and a 21 inch stroke. This engine is of the poppet valve type. No elastic or metallic packing is used; the valve stems are kept steam tight by means of the labyrinth system of water seal packing. Made two additions 22 by 68 feet to the wash house, which is now equipped with 6 shower baths, 12 wash stands, 36 concrete wash tubs and 435 lockers. Constructed a new warehouse 30 by 80 feet, with brick walls and concrete floor and roof. Completed fireproof building 30 by 68 feet for electrical department. Concrete fuel bins and a new concrete ash pit were made in the boiler room. The old warehouse has been remodeled so as to allow

fire protection was installed in the breaker and washery. Repairs to boiler plant were completed. Red Ash shaft engine house was rebuilt with brick and made fireproof. Tile hose house and scale office were erected. Colliery yard was regraded.

**Maltby Colliery.**—The pumping plant at this colliery has been abandoned. The water in the Marcy vein is carried in pipes to the lower elevation and forced up through an 8-inch bore hole to the Six Foot vein. It then flows to bore holes which were put through the barrier pillar to the workings of the Henry colliery, where it is pumped to the surface. A slope is being sunk in the abandoned Six Foot workings, Fuller shaft. Until recently these workings were under water. A Morgan-Gardner undercutting machine was installed in the Top Red Ash split. A spray system was installed in the breaker for fire protection. A concrete reservoir having a capacity of 50,000 gallons, together with a pumping plant, was installed near the breaker, to furnish water for the fire system. A steam shovel is at work picking up the culm bank at the Fuller colliery. A plane was constructed at the breaker and a locomotive track constructed for the purpose of transporting the culm to the breaker.

**Seneca Colliery.**—Two tunnels were driven from the bottom split of the Marcy vein to the top split. Two  $7\frac{1}{2}$ -ton Jeffery electric motors were installed in the Clarke vein. One 6-inch bore hole was drilled through the barrier pillar to the workings of the Stevens Colliery in the Marcy vein. A Jeanesville pump was installed and a fireproof pumphouse erected at the Twin shaft to supply the breaker with water. A Pennsylvania crusher was installed at the breaker to crush the refuse for silting in the Marcy vein. Safety automatic gates were installed at Twin shaft. Colliery yard was regraded.

**William A. Colliery.**—Electric haulage was installed from No. 10 tunnel to Evan's Farm section and the system was rebuilt to William A. shaft. This will allow all coal to be transported underground instead of dumping part of the output into railroad cars for shipment to the breaker for preparation. A new concrete engine house was constructed inside and a bore hole put down for exhaust steam to handle the coal on the Lawrence plane. A tile washhouse and foreman's office was built at No. 10 tunnel. Steel lockers for 32 men have been provided. A substation for electric power has been established at Babylon shaft. A spray system for fire protection has been installed at the breaker. Automatic safety gates were installed at William A. shaft.

**Westmoreland Colliery.**—A new second opening was driven from the Pittston vein to the surface. The plant for generating electricity and a new substation built. Power is now purchased from Luzerne County Gas and Electric Company. The feed wire system was also rebuilt. A new tile shop building is under construction. A spray system for fire protection was also installed.

**Stevens Colliery.**—Two 6-inch bore holes were drilled through the barrier pillar in the Pittston vein and two in the Red Ash vein. These bore holes were 250 feet long, and will be used for the purpose of draining Stevens colliery and abandoning the pumping plant. Steam blowers were dispensed with at the boilers and a blast fan installed. Old boiler plant was dismantled. Work was commenced to reopen the Pittston and Checker veins for pillars. Refuse banks are being silted into the mines through a new 10-inch bore hole. A rock crusher is used to crush the material.

**Maltby Colliery.**—Installed one 9 by 8-inch Ingersoll-Rand portable electric driven air compressor and "Jackhammer" in Ross vein, and Edison portable electric lamps for use in breaker. Made some improvements on engine road in Marcy vein.

**Broadwell Colliery.**—This mine is fully equipped with the following electric mining machinery: One 150-kw. motor generator; two 8-ton electric locomotives; two coal-cutting machines; one electric drill; one portable air compressor and "Jackhammer," and one 8-foot fan. The mine offices, shop, wash-houses, etc., are constructed of rugged face, hollow tile, and are equipped with modern appliances.

**Seneca Colliery.**—The Guibal fan at Coxe shaft has been replaced by a 12 by 4-foot Vulcan steel single-inlet fan. Installed an automatic car-handling device at head of Twin shaft. Completed a brick wash-house. Extensive repairs were made to breaker and 10 new jigs installed therein.

#### KINGSTON COAL COMPANY

**Kingston No. 4 Colliery.**—Installed two Hamilton-Corliss cross compound engines and one Ingersoll-Rand cross compound air compressor. Completed two 16-inch bore holes from surface to Red Ash vein, one to be used for conveying electric wires and the other as column discharge for turbine pump.

#### MINE FOREMEN'S EXAMINATIONS

The annual examination of applicants for certificates of qualification as mine foremen and assistant mine foremen was held in Pittston, April 23 and 24. The Board of Examiners was composed of Edwin C. Curtis, Mine Inspector; James J. McCarty, Superintendent, Luzerne; Thomas Grogan and John Evers, Miners, Luzerne.

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

#### MINE FOREMEN

Hadyn G. Jones, William L. Jones, West Pittston; John E. Dworske, Wyoming; William D. Weir, Isaac J. Reynolds, Forty Fort.

#### ASSISTANT MINE FOREMEN

Idris B. Jones, Oscar E. Williams, Pittston; Gomer Jones, George Deeble, Avoca; Arthur J. Button, Wyoming; Jaul J. Borosky, Exeter; Emlyn B. Jones, Forty Fort; Thomas F. Barry, Luzerne.