

*Newton Coal Company.*

At the Twin shaft a twenty-foot Guibal fan was erected on the air shaft as a duplicate to the old one. It exhausts 130,000 cubic feet of air per minute with a working speed of 67 revolutions. The fan is driven by a horizontal engine, cylinder 16 by 30 feet, directly connected to fan shaft.

*Butler Coal Company, Limited.*

A new shaft 12 by 18 feet, called the Chapman, has been sunk to the Red Ash seam, a distance of 120 feet. The second opening is not completed at this writing. The shaft is situated 4,800 feet southeast of a new breaker, which was built for the purpose of preparing coal for this and the Butler shaft. The coal from the Chapman shaft will be taken to the breaker by a small locomotive. A new fan will be erected as soon as the second opening is completed.

*Annora Coal Company.*

At the Annora colliery a new Guibal fan 16½ feet in diameter was erected to ventilate the tunnel workings, exhausting 102,870 cubic feet of air per minute with a working speed of 78 revolutions, run by a vertical engine, cylinder 11 by 18 feet.

*Stevens Coal Company.*

At the Stevens colliery a new rock slope was driven from the surface on a gradient of 30°, cutting the seam at a distance of 818 feet. All the coal from the old slope will be hoisted out of the rock slope, which will shorten the transportation considerably.

*Babylon Coal Company.*

In the Babylon shaft an underground plane was driven a distance of 1,800 feet on a gradient of 6°. The coal is lowered down by a pair of engines located at the foot, as the greater part of the coal in this colliery is to the rise of the shaft. This plan will be extended from time to time as necessity requires it to be done.

*Mount Lookout Coal Company.*

Two shafts were sunk by this company on the west side of the Susquehanna river close to the town of Wyoming, on the land of J. B. Schooley. The contract for sinking through the sand and gravel was given to Sooy, Smith & Co., of New York. The size of the shafts being 12 by 24 feet and 12 by 16 feet. The distance from the surface to the rock being 105 feet. The shafts being started in 1889 and completed in 1891.

On January 15, 1892, I wrote to Messrs. Simpson & Watkins for information and drawings in regard to the sinking of these shafts for this report, and received a reply from Sooy, Smith & Co., New York, Simpson & Watkins having referred my letter to them, who submitted the following to me:

NEW YORK, *January 18, 1892.*H. McDONALD, *Inspector of Coal Mines:*

DEAR SIR: Messrs. Simpson & Watkins have turned over to us for reply your letter of the 15th inst. asking for information and cuts in regard to the sinking of the Mount Lookout shafts through the quicksand. This work was done by us and we would say that it is extremely difficult to give a detailed or even a satisfactorily comprehensive account of the methods followed or difficulties overcome. In general the process adopted was the pneumatic or compressed-air process. Heavy timber caissons were constructed and sunk on the sites of the shafts by means of compressed air. The quicksand and soft material was excavated by sand pumps and blow pipes usual to such work. A heavy water-tight coffer-dam or crib was constructed on the edge of the caisson deck or roof and was carried up as the caisson sunk, always being above the surface and forming ultimately the walls of the shaft. Steel rail ends were loaded on the roof of caisson and on temporary decks constructed at different heights in the coffer-dam to supply the weight necessary to carry down the caisson as fast as the material was excavated. When the caissons reached the rock at about one hundred feet below the surface, a water-tight joint was made between the shoe or cutting edge of the caisson and the rock which was leveled off for that purpose. It being found that considerable water was coming through the top seams of the rock the latter was excavated in the one case to the depth of about sixteen feet, in the other to a depth of about thirty feet by blasting, and was finally sealed by heavy cement and timber work. The steel rail ends were then removed, the temporary decks and the main roof of the caisson cut out and a continuous water-tight shaft was thus secured from the surface of the ground to a number of feet below the top of the rock. During the progress of the work, and also for permanent purposes, the caissons and shaft were heavily braced. This is in outline the description of the methods adopted in sinking the Mount Lookout shafts. The drawings used as working drawings are of such nature as to be of no practical value to you. Regretting that we are not enabled to supply you more fully with the information you want, and hoping that the above will be of some use to you, and holding ourselves open to any specific inquiries you may care to make, we are

Very truly yours,

SOOY, SMITH &amp; Co.

The shafts were cribbed with Georgia pine 12 inches square, doubled and bolted together every three feet. The hoisting shaft came down on the side of an anticlinal causing a rock tunnel to be driven to reach the Pittston seam, a distance of 450 feet. A small locomotive has been placed in the mines to bring the coal to the foot of the hoisting shaft. A fan 20 feet in diameter was erected on one compartment of the hoisting

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gree pitch. A new fan of the Guibal pattern, 20 feet in diameter, has been erected on one compartment of the hoisting shaft to furnish ventilation for both seams. It is run by a horizontal engine, cylinder 16x20 inches, directly connected.

Annora Coal Company.

This company has erected a new Guibal fan 16 feet in diameter on the second opening to the slope, which furnishes the workings with a large quantity of fresh air. It is run by a 28-horse power engine, directly connected to fan shaft. A new shaft, 25x11 feet, was sunk 45 feet to the Marcy vein. It is located on the bottom of the Pittston vein on the strippings of the vein.

W. S. Payne & Co.

At the East Boston Colliery a new Guibal fan, 25 feet in diameter, has been erected as a duplicate in case of an emergency. It is run by a horizontal engine, cylinder 20x36 inches, and exhausts 141,800 cubic feet of air with a water gauge of 2-10 inches running 60 revolutions per minute.

Robertson, Law & Co.

At the Katydid Colliery a new Guibal fan, 12 feet in diameter, has been erected on the second opening to the slope. It is run by a horizontal engine, cylinder 12x12 inches, and exhausts 34,000 cubic feet of air per minute, with a water gauge of 5-10 inch.

Mount Lookout Coal Company.

This company has erected a new Guibal fan, 20 feet in diameter, on their air shaft, as a duplicate to the other, and have them so arranged that by closing one door and opening another, which will only take a few minutes to do, either fan could be run. It is run by a horizontal engine, cylinder 16x30 inches, and directly connected to fan shaft.

John C. Haddock.

At the Black Diamond Colliery a new air shaft, 14x12 feet, was sunk from the surface to the Cooper seam. The reason for this shaft having been sunk was that the old air shaft had been retimbered so often inside that the area had become too small to retimber it again in the same way, and to take the old timber out and replace it with new would necessitate the colliery to be shut down for some months, which the officials did not want to do. Therefore, the new one was started, which was quite an undertaking on account of the depth of quicksand to be overcome in that neighborhood. However, they were quite successful with it. The shaft was sunk through the sand 128 feet and 12 feet through shelly slate and coal, 140 feet in all, when, on

#### Improvements by the Florence Coal Company.

This company sunk a shaft from the surface to the Marcy seam, a distance of 227 feet. It has a sectional area of 220 feet. The coal is taken to the Elmwood breaker by a small locomotive a distance of 1,933 yards. The second opening has not been completed at this writing.

A 15 foot Guibal fan was erected on one of the compartments of the shaft, which is run by a horizontal engine 12x18 inches.

#### Improvements by Robertson and Law.

A new slope was sunk at the Katydid colliery from the surface to the Checker seam, a distance of 200 feet, area 7x9, grade 18 degrees. The coal from this slope is taken 2,000 feet to the breaker by a locomotive. The workings are ventilated by the Consolidated slope fan.

#### Improvements by the Babylon Coal Company.

A tunnel was driven from the top to the bottom split of the red ash seam, a distance of 162 feet, area 7x12, to be used for transportation of coal.

#### Improvements by the Forty Fort Coal Company.

The "Harry E." shaft of this company was sunk from the eleven foot to the red ash seam a distance of 229 feet, area 22x12 feet. The second opening shaft was sunk to the red ash seam at the same time, and a new 20 foot Guibal fan erected therein, run by a vertical engine directly connected to fan shaft.

#### Improvements by the Delaware and Hudson Coal Company.

Two tunnels were driven in the Delaware shaft, one between the Baltimore splits, a distance of 150 feet, the other to the Ross seam, 300 feet in length, to be used for transporting coal. Two air shafts were sunk to a depth of 30 and 50 feet respectively, to air the workings of these tunnels. Two inside slopes are being sunk on a 15 degree pitch and are 160 and 180 feet down at present.

#### Improvement by the Mt. Lookout Coal Company.

Electric Power Plant, Mt. Lookout Coal Company, Wyoming, Penna.

The power house containing the generators and engine is a separate brick building forty by thirty feet, situated about two hundred feet from the mouth of the main hoisting shaft and about one hundred feet from the air shaft. The generating plant consists of one M. P. 4. 100 Kilowatt, (135 H. P.) generator, driven at a speed of 650 revolutions per minute and developing 575

volts at full load; and one M. P. 4, 20 Kilowatt (27 H. P.) generator, driven at a speed of 675 revolutions per minute and developing 550 volts at full load. Both generators are belted direct to one 16x18 inch single cylinder, automatic high speed engine, built by the J. H. McEwen Manufacturing Co. The engine runs at a speed of 218 revolutions per minute and receives steam at about 100 pounds pressure from the main battery of colliery boilers situated a short distance from the power house. The generators are the standard multi-polar type manufactured by the General Electric Company. A view of the inside of the power house before the smaller generator was installed is shown in Fig. 1.

The larger generator furnishes current for haulage, drilling and pumping in the mine; the smaller one furnishes current for arc and incandescent lighting circuits on the surface; although by the use of suitable switches, the smaller generator can be connected to the pumping line as a reserve power in case of accident to the larger one.

The current for the haulage, pumping and lighting circuits is distributed from two skeleton wood switchboards which are equipped with Weston ammeters and volt meters and Carpenter enamel rheostats. The switches, circuit breakers, lightning arresters, etc., are of the standard type manufactured by the General Electric Company.

The offices, engine and boiler houses, etc., are lighted by 16 c. p. incandescent lamps, while the breaker and surrounding grounds are lighted by 2,000 c. p. arc lights. At present there are fifteen incandescent lamps and twenty arc lights on the surface, although the smaller generator is capable of furnishing current for double this number of lights.

The conductors for the inside lines are suspended in the down cast air shaft, and consist of No. 000 and No. 0000 Siemens lead covered cables for feeders and No. 0 bare wires for returns. The total depth of the air shaft is about 300 feet. From the bottom of the air shaft, the feeder lines are suspended along the main gangways parallel with the trolley wire or through old workings or air ways. The feeder lines in the mine consist of waterproof, rubber covered copper wire. All feeder wires are run on glass insulators attached to roof blocks.

By referring to the map showing the plan of wiring, it will be seen that the feeder line divides at the bottom of the air shaft, one branch supplying current to the trolley wire in the north workings and the other branch supplying current to the trolley wire in the south workings. The pump circuit follows the south branch of the feeder line until it reaches the bottom of a slope at E. where it passes into the main air way. The north branch of the feeder line is connected to the trolley line at D, which is about 300 feet from the bottom of the air shaft:

the south branch is about 1,000 feet long and is connected to the trolley wire at E. No. 0 hard drawn copper wire is used for the trolley lines with bonded rail returns. The trolley wire is suspended to oak roof blocks by a special mining ear which clamps the wire instead of being soldered to it.

The haulage in the north working is done by one General Electric Company's standard T. K. M. 15 locomotive with inside wheels. The locomotive is equipped with two 15 H. P. waterproof motors, single reduction, and is capable of exerting continuously a draw-bar pull of 1,500 pounds on a straight level track at a speed of six miles per hour; at starting it will develop between 3,500 and 4,000 pounds draw-bar pull without slipping its wheels. The total weight of the locomotive is about six and one-half tons. Its extreme dimensions are 11 feet 4 inches long, 57 inches wide and 34 inches high. Fig. 2 gives a view of the locomotive in actual operation.

The total length of the gangway over which the T. M. M. 15 locomotive runs is about 2,800 feet; although, including sidings and turnouts, there is about 3,000 feet of trolley suspended in the north workings. The locomotive is making from 20 to 25 round trips per day, hauling at present 7-car trips. The locomotive is capable, however, of handling about twice this output. The grades on the gangway from A to C on the map, are all against the empties, varying from a level up to 2.8 per cent. as a maximum.

The haulage machinery in the south workings consists of one General Electric T. M. M. 25 locomotive with inside wheels. It is equipped with two 25 horse power single reduction motors and is capable of exerting continuously a draw-bar pull of 2,500 pounds on a straight level track at a speed of 6 miles per hour; at startings, however, it can exert between 4,000 and 5,000 pounds draw-bar pull without slipping its wheels. The total weight of the locomotive is about ten and one-half tons. Its extreme dimensions are as follows: length over all 11 feet 4 inches, width over all 58 inches, height above the rail 34 inches. Fig. 3 shows the locomotive before it was placed underground.

The maximum length of run in the south workings which the locomotive makes is about 1,200 ft., including sidings and turnouts, however, there is about 1,800 feet of wire in the south workings. At present the locomotive is making from 40 to 45 round trips per day, hauling ten-car trips. The trips are made up in the entries, F, G, H and I, as shown on the map: the locomotive pushing in a trip of empties and hauling out a trip of loaded. The heaviest work is done by the locomotive in starting the trip from these entries, as there is a sharp curve and grade against the loaded. The main gangway from E to the branches H and I is rather uneven, the grades averaging from

about one per cent. against the loaded to one per cent. in their favor. The mine cars weigh 3,000 pounds unloaded and about 8,000 pounds loaded, and have a capacity of 69 cubic feet. Eventually, the haulage line in the south workings is to be extended along the gangway from H to K and through a rock tunnel to L, as shown on the map. When this is done, the branches F, G and I are to be abandoned and the locomotive will then make a trip over about 3,500 feet of track, and haul about 400 cars per day from the end of the rock tunnel at L.

The electric pump is located in the workings off the branch I as shown on the map. The pump is of the standard duplex, double-acting, piston type, manufactured by the Knowles Pump Works, and is operated by a General Electric Company's waterproof shunt wound motor developing about 15 horse power. The pump is capable of throwing 300 gallons of water against 40 feet head. It has been operating for over a year, doing duty twenty-three hours a day. It requires attention only at starting and stopping and for occasional lubricating. The speed of the pistons is absolutely constant, irrespective of the amount of water thrown, and when the water in slump hole or chambers falls below the mouth of the suction pipe, the pump does not race, and hence demands no attention. Fig. 4 gives a view of the pump in its chamber.

In addition to the electric pumping and hauling machinery, the Mt. Lookout Coal Company are operating two General Electric Company A-4 rotary coal drills. The drills are being used in a low seam in the southeast workings and are run from a circuit taken from the circuit connected to the feeder lines in the main gangway. At present, the length of the circuit from the feeder line is about 1,400 feet. The drills are used in working a three-foot seam of coal and taking up about two feet of slate bottom. In coal the drill makes about six feet per minute with an inch and a half bit, and in slate or boney it can drill about four feet per minute. The weight of each drill complete with post is 160 pounds, the drill itself weighing 100 pounds. A view of one of the drills is given in Fig. 5, where it is set up ready for operation.

#### The Burning of the Annora Breaker.

At 3.30 on the morning of Tuesday, December 4, 1894, the large breaker of the Annora Coal Company, located in the borough of Lafflin, was discovered to be on fire and was totally consumed, and all the machinery more or less damaged or destroyed. The last coal put through the breaker was in the month of August, 1894, the colliery then closing down for the remainder of the year. A new company had taken the colliery some time previous to the fire and were

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### Improvements by the East Boston Coal Company.

A tunnel was driven in the East Boston shaft a distance of 108 feet, from the Cooper to the Lance seam; area 7x14 feet.

In the Baltimore seam an underground slope was sunk 250 feet, 8x12 on a pitch of 7 degrees.

At the Langcliffe colliery an air shaft was sunk 70 feet to ventilate the tunnel workings; area, 30 feet.

### Lafin Coal Company.

This company erected a new breaker on the site of the old one which was burned, and which was recorded in my last report. It is a model structure and contains about 900,000 feet of lumber and is fitted with the most approved machinery for cleaning and preparing the coal. It has a capacity of 1,000 tons per day and was started to ship coal in November, 1895. All the dangerous parts are protected by railing or covering as the law requires. A new shaft was sunk 600 feet northeast of the breaker; size, 12x26 feet, cutting the Marcy Ross and the both splits of the Red Ash seams at a depth of 256 feet. The second opening will connect with the slope workings when completed. A new fan 17 feet in diameter was erected to ventilate the shaft workings. The engine is 15x18 inches directly connected.

### Babylon Coal Company.

A tunnel was driven in this colliery from the top to the bottom split of the Red Ash seam, a distance of 140 feet for transporting coal.

### Mount Lookout Coal Company.

A tunnel was driven through a rock roll in the Pittston seam in this colliery a distance of 1,000 feet, area 7x12 feet. A new fan 20 feet in diameter was erected to help ventilate the workings which are very extensive. This is the third ventilating fan erected in this colliery. An underground slope was sunk 600 feet; area, 8x12 feet.

The main and air shafts are now being sunk to the Red Ash seam.

### Algonquin Coal Company.

In the Pine Ridge colliery a shaft was sunk to the Checker seam, 28 feet for ventilation. A tunnel was driven from the Hillman to the Rock seam a distance of 116 feet; area, 7x12 feet. A shaft was sunk from the Hillman to the Kidney seam as a second opening to those veins.



fectured workings be determined. I was notified in the afternoon by Superintendent S. B. Bennett, of the Colliery, who accompanied me to the shaft. We went down the shaft with the mine boss, Mr. Brady, and going down the slope to the first lift found the pillars crushing and the props and timber breaking so that it was not safe for any person to be down the shaft when the fall would take place. Therefore, I left orders that no one should be allowed to go down the shaft until the collapse had taken place and the roof settled. In the afternoon about five o'clock the mine boss and fire boss went down the shaft to make another examination and went a short distance from the foot of the shaft to listen for any working of the roof in that direction, and while passing through a door on the airway the fire boss, who had an open light with him at the time, came in contact with a body of explosive gas, igniting it, causing an explosion which ignited the feeders in the abandoned workings of the slope where the squeeze was in progress and also setting fire to the coal. uh

Fortunately neither of the men was burned, as the air current on the airway was very strong, keeping the flames from reaching them. The action of the mine boss and fire boss in using an open light under the above conditions cannot be too severely condemned, yet how frequently such carelessness is shown even by those who should know better. In going down the shaft that night after twelve o'clock with the fire boss of the "Schooley shaft," I arrived at the conclusion that the safest and best way was to flood the slope workings immediately with water, as there was no knowing how soon the fire would get above the shaft level. I therefore informed Mr. Bennett of my decision and requested him to keep all persons from going down the shaft until the danger of an explosion should be past. The next day they had two streams of water pouring down the shaft and it took about one week to flood the slope workings to the shaft level. On the 15th Mr. Moister and Mr. Owens, superintendents from the Lehigh Valley Coal Company, with Mr. Bennett and myself, went down the shaft and made a thorough examination and came to the conclusion that the fire was extinguished and the cave had been confined to the slope workings. As there were no indications of any squeeze on the shaft level the mine was placed in order again for resuming work.

#### The Burning of the **Mount Lookout** Breaker.

On January 8, 1896, the large and commodious breaker of the Mount Lookout Coal Company, located at Wyoming, was discovered to be on fire and was totally consumed and all the machinery destroyed or damaged.

The supposed cause of the fire was a hot journal. The company proceeded without delay to clear up the debris and ordered the timber for rebuilding, as soon as the alterations in the plans could be made. As the breaker is on a different plan from the old one, it took considerable time to alter the plans to fit the old site with the new structure.

The new breaker is what is called a "wet and dry" breaker; that is, it has one dry side where all of the coal coarser than stove coal is prepared without using any water. To the wet side is carried all of the various sizes which are separated by screens and run into jigs for the purpose of picking out the slate. The wet side consists of six shaking screens, six by nine feet, and twelve jigs which are known as the Lehigh Valley pattern. Three of these jigs clean the stove coal, four the "chestnut," three for "pea," and two for "buckwheat," and they are doing the work in a very satisfactory manner. The coal that goes to the dry side is slated by the "Zigler Automatic Separators." Of this kind of slate picker there are 16 in the breaker, ranging from five feet to eight feet wide. The pickings from these pickers in the main dry screen room are taken up in an elevator and re-picked. In this way the slate in the coal is reduced to about four to five per cent. These pickers also separate the bone from the slate. This bone runs to an extra set of rolls which grinds it to a smaller size. These smaller sizes which are made from the bone, are elevated to the shakers on the wet side and sized, and then run to the jigs, which remove the slate. The largest size they make from these rolls is chestnut coal. All the doubtful pickings from the jigs run to a separate set of small rolls which grind to pea and buckwheat and it is re-elevated to the wet side and reslated. The jigs make a very perfect separation of the sizes of pea and buckwheat. In all its departments this is one of the most complete breakers for cleaning and preparing coal in this part of the Anthracite coal field. It was started on August 24, 1896, to prepare coal for shipment.

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## COLLIERY IMPROVEMENTS FOR 1896.

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### Improvements by Pennsylvania Coal Company.

On June 4, 1896, the Schooley Colliery passed out of the hands of the Butler Mine Company, Limited, and into the possession of the

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

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

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

#### Improvements by the Mount Lookout Coal Company.

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

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

#### Improvements by the Lehigh Valley Coal Company.

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

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  $28\frac{1}{2}$  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

dump room at the top of breaker, a distance of 300 feet. A No. 7 Harwood steel brushed chain with 12x48 inch flights, made by the Exeter Machine Works, of Pittston, Pa., conveys the coal along this chute to top of breaker for preparation.

A new addition has been built to the breaker, which has a capacity of 600 tons per day, for handling and cleaning all dirty coal by the process of washing the coal with water. A number of jigs and shakers were put in to prepare the smaller sizes for market.

Two tunnels were opened on the north end of the property to the Clark and Marcy seams. The Clark seam was cut at a distance of 525 feet; 425 feet of this was driven chiefly through quicksand which required double timbering with 12x12 timber with underlying mud sills, and is closely lagged with three-inch planks.

The other tunnel has been driven to the Marcy seam a distance of 160 feet, which required timbering in like manner as the above. The coal is taken from these tunnels by a 15-ton steam locomotive over a road three miles long to the breaker, where it is dumped and taken up in the breaker by the same line of conveyors that takes the shaft coal up.

The Clark seam is ventilated through the Red Ash vein by a rock plane driven for the purpose, and the Marcy tunnel is ventilated by a 12-foot fan run by compressed air, which gives great satisfaction at present.

#### Mount Lookout Coal Company.

At the Mount Lookout colliery a Sullivan undercutting machine was placed on trial in the Marcy seam, which is four feet in height and of a very hard nature requiring considerable powder to blast the coal required for a day's work. Therefore, this machine was placed on trial to test the practicability of adopting this method of mining in this vein. But what success has been met with in the different tests is impossible for me to say at present, as the drill has been in use only a few months, and this being the first cutting machine in the anthracite coal as I understand, it requires careful testing before it should be accepted or condemned. Therefore, the drill is placed to undercut in the different parts of the seam. A test has been made by cutting out the bony coal and again undercutting close along the bottom and carefully noting the results of each test. When I examined the machine at work they were undercutting along the bottom of the seam which is undermined from pillar to pillar across the face of the breast and four feet under; then three holes are drilled, one on each pillar, the other in the centre, and very little powder is required to bring the coal down. The opening at the face of the chamber in height to allow the drill to undercut the four feet is about ten inches and tapering down to the

back end. There was an expert handling the cutter, which is no light work to manipulate, who was sent by the manufacturer to make the tests. The machine is run by compressed air conducted in iron pipes from the surface down the shaft and along the heading road and then taken up the chambers by hose. It appears to be the proper method of mining coal in small and hard seams as well as larger ones, as undermining the coal and then blasting it down is certainly the proper way of mining, as a great loss of coal takes place by blasting it out of the solid, especially when the holes are too heavily charged with powder which throws the coal into the gob where it is not obtainable and is lost, as it is mixed with the refuse of the chamber, causing a loss to the operator as well as the miner.

#### Mine Accidents.

During 1898, 85 persons were killed or fatally injured and 201 were more or less seriously injured in and about the mines of the Third anthracite district. Of the number killed, 19 lost their lives in four separate accidents, which caused the increase over last year. The four accidents referred to are the Hallstead shaft, whereby David Emanuel, fire boss, and Thomas Williams, miner, lost their lives by venturing too far under a general settling of the roof in the old abandoned workings of the Red Ash vein after being warned by the mine boss to take no unnecessary risk by entering the disturbed district where the crush was in progress.

On May 5 Stephen Jenkins, James Monohan and John Titus lost their lives in the above shaft while putting guides in the shaft. The accident was caused by a chain used as a sling to hold the tackle block which was used to lower the guides to the men in the shaft giving way, allowing the guide to fall down the shaft, knocking the platform from under the men, causing them to fall to the bottom of the shaft and instantly killing them.

The other two accidents, one at the Midvale slope on October 1, whereby five men lost their lives by suffocation caused by the timber in the intake airway taking fire. The other accident occurred in the Exeter shaft on the morning of November 5, when nine men who were descending the shaft to work were killed by three loaded mine cars being run into the shaft by a misplaced switch. The evidence taken at the coroner's inquest of those accidents I send with this report.\*

The verdict of the coroner's jury in the case of the five men who lost their lives by having been suffocated in the Midvale colliery on October 1 by smoke from timber in mine taking fire was that the

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\*The evidence before the coroner's jury in this case is on file in the Bureau of Mines.

### Annual Examination for Mine Foremen's Certificates.

The annual examination of applicants for certificates of qualification for mine foreman and assistant mine foreman was held at the Butler Hill school building, Pittston, Pa., May 23, 24 and 25, 1899.

The board of examiners was H. McDonald, Inspector of Mines; David W. Evans, superintendent; M. W. Tigue and J. J. Morahan, miners. Twenty applicants appeared for examination for mine foreman's certificates and forty-eight for assistant mine foreman's certificates.

The following named fifteen were recommended to have mine foreman certificates: James Brown, John J. Doyle, James F. Langan, Samuel Hamblett, John T. Clark, Pittston; Robert J. Oliver, Thomas D. Rowland, William J. Tilley, Avoca; Anthony T. O'Malley, Hugh Price, Thomas Kelly, Plains; Frank S. Reilly, Forty Fort; Anthony J. Duffey, Plainsville; George Yates, Wyoming; Frederick J. Weaver, Duryea.

Forty-eight persons were recommended to have certificates of qualification for assistant mine foreman issued to them.

### Burning of No. 6 Washery, Pennsylvania Coal Company.

On May 30, 1899, about 1 A. M., the No. 6 washery of the Pennsylvania Coal Company, situated between No. 6 breaker and the Ewen breaker, was discovered to be on fire. Herculean efforts were instantly put forth to save the building from destruction, with all the means at hand, but in one hour it was completely consumed. That evening, and at the time of the fire, there were three workmen employed in the breaker making some repairs to the shakers, the watchmen being in the weigh office at the time. The fire originated in the engine room, but the exact cause of its origin has never been ascertained. The washery was a comparatively new one having been built the year before and gave employment to a number of men and boys when in operation.

A new washery has been erected on the site of the burned one which is supplied with all the latest improved machinery for preparing the coal for market. It is expected to start up in January, 1900.

### Burning of the **Lookout** Breaker.

On the morning of August 21, 1899, the large and commodious breaker of the Temple Iron Company, located at Wyoming, was discovered to be on fire at 6 A. M., and was totally consumed, and all the machinery was destroyed or damaged.

The fire was first discovered in the top of the breaker, which, in a few hours, was burned to the ground, although strenuous efforts were made by ample means kept in and around the breaker for fight



ing fires, but before it was discovered the fire had got too great a headway to be successfully fought. How it originated cannot be determined, as there was no fire or open lights allowed in or about the breaker. This company has been very unfortunate, as this is the second time for this colliery breaker to be burned inside of a few years.

The first breaker was built in 1891, and was started up to prepare coal in August of the above year. In about four years and a half later, or on January 8, 1896, it was destroyed by fire, which originated from a hot journal. The breaker, which was recently burned was what is called a wet and dry breaker, and had a large capacity for cleaning and preparing coal for market. It was started up on August 24, 1896.

A new breaker is in the course of erection on the site of the burned one, which will be of the same capacity and is expected to be in operation by March or April of 1900.

#### Fire in No. 6 Shaft, Pennsylvania Coal Company.

On Tuesday morning, December 13, 1898, Thomas McDonald, the fire boss, on entering the mine at an early hour to make his examination, as required by law, discovered that the timber of an inside slope in the Fourteen Foot, or Pittston, vein was on fire and that the fire had attained considerable headway. He immediately returned to the surface and sent word to the mine foreman, John F. Reynolds, who, upon seeing the serious condition of affairs, sent word to James Young, assistant superintendent of mining, and James Y. Bryden, district superintendent. A hasty conference was held and immediate action taken to get water into the mine. The water line outside was connected with the 2½-inch speaking tube in the shaft and connected by hose from bottom of shaft to the fire. For a time the water appeared to be getting the better of the fire, but as the men advanced down the slope the heat and fire became greater, and the heavy draft on the water line which feeds the colliery boilers, interfered with a steady supply to the hose of sufficient pressure to do much good, therefore, more water was necessary. The steam pipe from the No. 6 washery to the No. 6 boiler plant was disconnected and used as a water line down the shaft. The washery pumps were then started, and a good supply of water obtained and for a time hopes were entertained that the fire would be extinguished by this means. However, on Friday forenoon, December 16, the Mine Inspector for the district went in with Assistant Superintendent James Young and the foreman, who made a thorough examination and came to the conclusion that the fire had eaten its way down into the old and fallen workings of the abandoned No. 2 slope, and it was their opinion that it could not be extinguished except by flooding the workings. On reach-

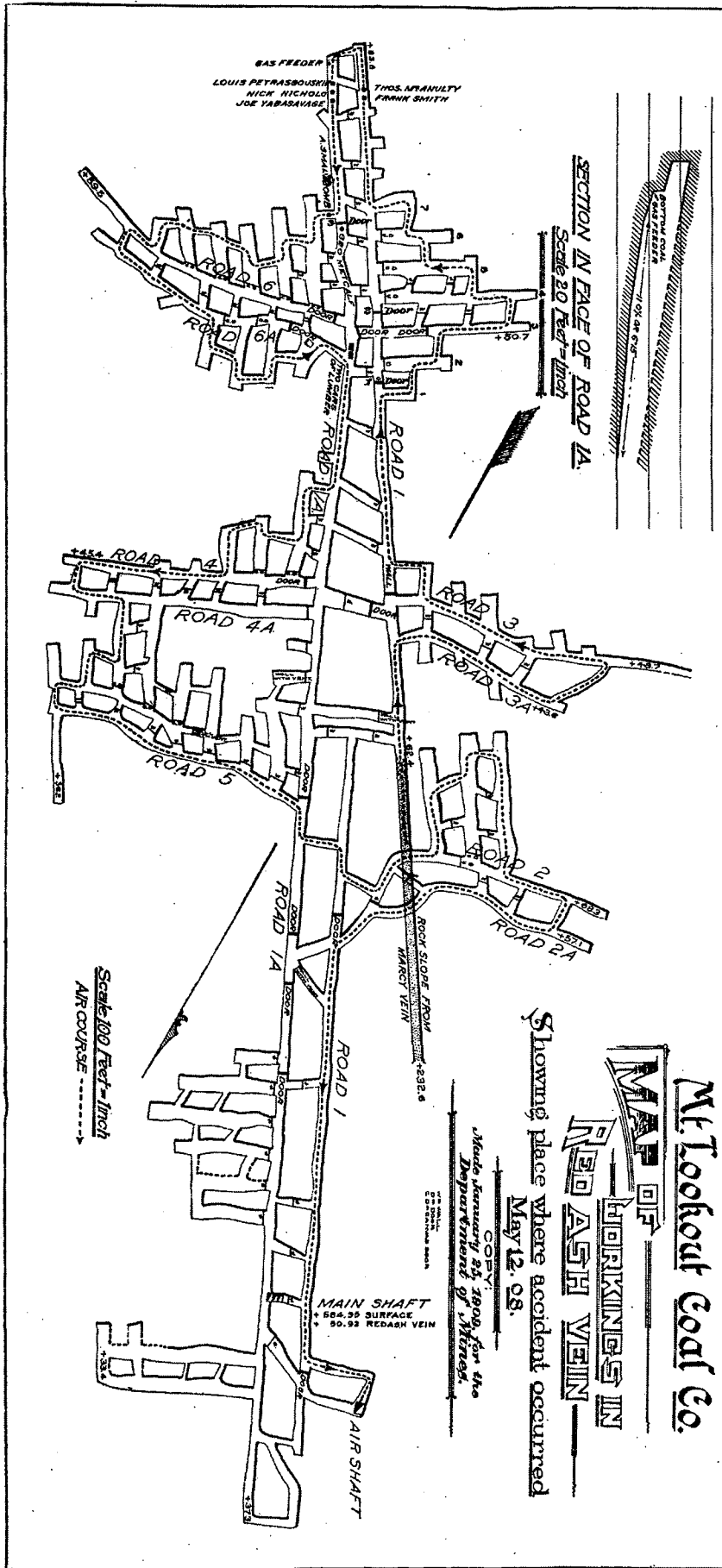
**MOUNT LOOKOUT** EXPLOSION

The following is a brief description of the Mount Lookout accident where twelve men lost their lives and eleven others were more or less seriously injured by an explosion of gas, in the South Gangway of the Red Ash vein, on the afternoon of May 12, between three and four o'clock. My investigation shortly after the accident shows as follows: Joe Coslick, miner No. 610, working on the night shift in the South Gangway in the Red Ash vein, quit work at eleven o'clock on the night of May 11, and apparently left a feeder of gas burning in his working place. After the night shift the men were all out of the mines, the fan was stopped for twenty minutes for minor repairs. The pump runner, who is stationed near the foot of the Red Ash slope, informed the night fire boss that an explosion had occurred at about three o'clock. The fire boss upon examination found a small fire in the face of the gangway and reported it to the mine foreman, Bernard Holleran, at six-thirty on the morning of the 12th. The mine foreman immediately made an examination of the place, together with the night fire boss, and found a small fire in the face of the South Gangway of the Red Ash vein. The mine foreman immediately organized a corps of workmen and, as he supposed, extinguished the fire. He reported the fact to the district superintendent, George W. Steele, and his assistant, Gilbert Jones, who in company with the mine foreman made an examination of the place. They could not find any fire, but about thirty minutes after the examination a slight explosion occurred, followed by another still slighter explosion about thirty minutes later. Coming to the conclusion that they must have overlooked a small fire in the effected territory, they immediately organized a corps to establish the air current, which had been interfered with by these slight explosions, to remove any accumulated gas in order to enable them to reach the working face and make further investigations. About 12 o'clock the gas had been removed so that the men were enabled to reach the working face, and, while they did not find any fire, they found some ashes and considerable heat where the fire had been.

They organized a bucket brigade to carry water from a slight dip, about eighty feet from the working face, to pour on the coal that was still hot. After continuing this work for about three hours, they felt thoroughly satisfied that no further fire remained, and a large gang of men was put to work in relays building doors, block cross-cuts and opening up the cross-cut close to the face which had merely been holed through.

About three-thirty another explosion occurred that killed seven men, burned fifteen and injured one. Of the seven men killed two were burned, and five were either killed by the concussion or died from the effects of the after-damp. Of the fifteen men five were burned seriously, but the others were only slightly injured.

I ordered an inquest to be held to ascertain, if possible, if any person or persons had been negligent in any way. Dr. D. W. Dodson, the Coroner of Luzerne county, conducted the inquest and the first



hearing was held on May 25, at the Town Hall in Exeter borough. After five long drawn-out hearings and the testimony of a great many witnesses, the Coroner's Jury brought in a verdict on June 5 to the effect that the officials of the Mount Lookout Colliery, namely, George W. Steele, Superintendent, Gilbert Jones, Assistant Superintendent, Bernard Holleran, Inside Foreman, and Robert Whitely, Inside Foreman, erred in their judgment in permitting so many men in the mine. The matter stood for some time pending a personal investigation prior to commencing prosecution against these officials. My attorney, the late Hon. George Troutman, was looking up the law and also the testimony in order to make out a case if possible. In the meantime the District Attorney seemed to be very active and wanted to bring the men before the Grand Jury on a charge, I presume, of criminal negligence. He tried very hard to force the Inspector of the District to become the public prosecutor, but, having failed in this, he had warrants sworn out for the arrest of the officials above mentioned, with Mr. Edward Mackin, the County Detective, as prosecutor, but before these warrants could be properly executed, the Mine Inspector through the advice of his attorney had warrants sworn out for their arrest under Article XVII, Section 1, of the Anthracite Mine Law, approved June 2, 1891, he advising that this was the proper course to pursue.

The District Attorney, however, was permitted to conduct the case by order of the Court. The information was issued on September 11, and the trial was commenced before the Hon. Henry A. Fuller, Judge of Luzerne county, October 19. The hearing lasted four days and was ably conducted by the attorneys on both sides. Judge Fuller's opinion in this case was a very able document and very impartial. This ends probably one of the most bitterly fought legal battles over a mine accident case that has ever taken place in the county. The Mount Lookout colliery is in my opinion among the best ventilated mines in my district, and to have such a terrible accident caused by an explosion of gas is something that no one familiar with the condition of the mine would ever expect.

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## CONDITION OF COLLIERIES

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### LEHIGH VALLEY COAL COMPANY

- Exeter Colliery.—General condition as to safety good.
- Maltby Colliery.—General condition as to safety good.
- Westmoreland Colliery.—Condition as to safety good.
- Seneca Colliery.—Ventilation much improved, and general condition as to safety good. Roads in poor condition.
- William A. Colliery.—General condition fair.

### TEMPLE IRON COMPANY

- Mount Lookout** Colliery.—General condition good.
- Forty Fort Colliery.—Ventilation, drainage and condition as to safety good.

about 200 feet southeast from the slope, from which the water is discharged through a new 14 inch bore hole, 150 feet deep, to the surface, where it is utilized in handling the material from the culm bank now being prepared.

The Red Ash workings east of the Lackawanna river are being silted preparatory to robbing the pillars.

At Babylon about 1,500 feet of standard gauge track have been laid and a steam shovel placed for the removal of the culm bank to the Lawrence washery for preparation.

#### TEMPLE IRON COMPANY

Mount Lookout Colliery.—Three 120 K. W. 250 volt direct-current generators have been installed in the electric plant to replace three 100 K. W. 500 volt generators, and the circuit in the mine changed to conform with the 250 volt current.

A new fire-proof brick boiler house, 33 x 51 feet, with steel roof and adjoining coal bin, 15 feet 2 inches x 51 feet x 17 feet deep, of reinforced concrete, has been built, and two 250 H. P. Stirling water tube boilers installed therein.

Harry E. Colliery.—A new brick boiler house, 144 feet 4 inches x 41 feet, with steel roof and adjoining coal bin of reinforced concrete, 17 feet 6 inches x 144 feet 4 inches x 20 feet deep, has been built. The five original Stirling boilers have been rebuilt and two others of 250 H. P. each added, making a plant of 1,625 H. P. at this colliery. Forced draft by blower fan, feed water regulators, fuel and ash conveyors have also been installed.

A new ventilating fan, 25 foot diameter, 8 foot face, has been erected at the No. 2 Shaft, driven by an 18 x 36 inch engine. The fan house, casing spiral and chimney are all of reinforced concrete.

#### KINGSTON COAL COMPANY

Kingston No. 4.—A new brick electric generator house completed, in which three 240 K. W. direct driven generators have been installed.

A new four-stage centrifugal pump placed in the Orchard vein.

One 24 x 10 x 36 Duplex pump at Orchard Level.

One new 28 x 10 x 36 Duplex pump at Bennett vein, together with new culm and steam lines for same.

One 20 x 38 x 10 x 36 Compound pump installed at Red Ash shaft discharging through a new 10 inch bore hole, 650 feet long, to the surface.

One new concrete reservoir, with a capacity of 750,000 gallons, to supply the breaker and washery.

Two 20 x 12 x 36 pumps located at the reservoir.

Brick addition to the warehouse.

One brick waiting room for the miners and safety lamp station built at the head of No. 1 Shaft.

Boring surface test holes continued throughout the year.

A new 8 x 25 foot fan in concrete casing and house finished, new fan in operation since March.

A new school for the instruction of the foreign miners and other employes of the company has been opened and has met with encouraging success. The course of lectures on mining questions has also been continued throughout the year.

**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 rear-ranged 6 sets of Christ jigs. Fuel conveyor from breaker to boiler room.

**Inside.**—Driving new slope from Pittston vein to Marcy (called No. 7 slope). One electric locomotive, 7½ 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 20x24x14½x11½x5x24. 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 20x38x10x18, with

10x36 inch, in Bennett vein and pumping through bore hole direct to surface. One small electric pump, 4x5 inch.

Have been driving slopes in Orchard, Bennett and Ross veins.

Are driving rock plane upon 15 degrees from Bennett vein to upper veins, which will cut Cooper, Lance, Orchard and Hillman veins.

#### DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Pettebone Colliery.—The new boiler plant referred to in my last report has been completed and is composed of 10 fore-box locomotive boilers.

Breaker improvements consist of mechanical pickers, elevators, conveyors and spring balance shakers for the preparation and cleaning of coal.

Inside improvements consist of two 7x12 rock tunnels, one driven from the Cooper to the Lance vein, the other was driven through what is known as the Pettebone anticlinal Hillman vein. The condition of haulage roads and return airways has been improved upon.

#### TEMPLE IRON COMPANY

Mount Lookout Colliery.—New boiler house (frame building) 140x40 feet inclosing 8 sets of Sterling boilers and one new rock crusher to crush all the mine rock which is returned and deposited in the mine.

#### CLEAR SPRING COAL COMPANY

Clear Spring Colliery.—Have erected a new washery at this colliery to prepare the marketable coal in their large culm dump. They run all the sedge and refuse from this washery into the mine. The cost of this washery was about \$25,000, and in addition to this the company expended nearly \$3,000 in yard improvements, which include the changing of their tracks, etc., making a total expenditure of about \$28,000.

#### PEOPLE'S BANK, RECEIVER (PLYMOUTH COAL COMPANY.)

Black Diamond Colliery—Inside.—Driving one tunnel from Red Ash to Ross veins.

Erected at breaker one set of Emery slate pickers for separating slate from stove coal.

Outside.—Scraper line and rolls for breaking and conveying slate to mines for flushing mines.

Completed 12x72 inch x 18 feet return tubular boilers. These boilers were begun in 1903.

#### DELAWARE AND HUDSON COMPANY

Langcliffe Colliery.—No. 1 slope Checker vein, driven 400 feet to crop. No. 2 slope Red Ash vein driven 500 feet to crop.



Two tunnels from top to bottom Ross.

New brick boiler house has been constructed.

One 250 H. P. Root boiler installed, and 300 H. P. Stirling boilers now under construction.

A system of fire protection, water lines, fire hydrants, etc., has been installed.

The fan has been entirely rebuilt.

A new second opening is under construction from the Pittston vein to the surface.

A new central pumping station is being pushed to completion in the Marcey vein.

Steam lines have been taken out of slopes and are now run down new 10 inch bore hole.

A 14 inch column pipe is being constructed.

Six inch silt hole completed from surface to the Marcey vein.

Williams crusher being installed.

A new Duplex pump has been placed in the Marcey vein.

The old flue boilers and cylinder boilers have been dispensed with.

New warehouse built.

New brick boiler fan, feed and fire pump house completed.

Pittston vein is being regraded and enlarged.

Drainage bore hole completed from Pittston to Marcey vein.

Seneca Colliery.—Six new jigs were installed in breaker.

The new shaft to the Pittston vein was completed, and a second opening was also driven.

The Phoenix is now ventilated from the Twin and Coxey, as the fan for that purpose has been removed to the Pittston vein shaft.

#### TEMPLE IRON COMPANY

**Mt. Lookout** Colliery.—The main shaft has been sunk from the Marcey vein to the Red Ash vein, a distance of 180 feet. A connection has been driven between the main and supply shafts in the Red Ash vein, and the gangways continued in a southerly course from the main shaft, a distance of 600 feet.

A rock slope was driven from the Marcey vein to the Red Ash vein on 19 degree dip, 560 feet in length. This slope cut the Red Ash vein about 1,000 feet southerly from main shaft. Gangways were turned on course to meet gangways driven from main shaft, and have 200 feet of drive to make connection. Two new  $7\frac{1}{2}$  ton electric locomotives have been installed in Marcey vein and are giving good satisfaction.

The main fan house, containing two 8x20 foot fans, was burned on June 5. The fire is supposed to have started from a hot journal. One fan was repaired sufficiently to enable men to resume work after two days idleness; the other fan was repaired and enclosed by a concrete building. The engine house, fan casing, division wall, air ducts and spiral are entirely made of concrete, making an absolutely fire-proof building. On account of the effect of cold weather on concrete during construction they have decided to defer the erection of the other fan house until spring.

A pair of 20x38 inch hoisting engines were erected on the supply shaft in place of a pair of 14x16 inch engines, which were inadequate

to do the work required. The engines are enclosed in a fire proof building, size 22x33 feet.

A 10x18 foot frame building was erected to enclose fire pump.

Forty Fort Colliery.—A 10x14 inch locomotive has been installed to haul mine rock from the shaft to the dump, and a 16x24 foot locomotive house erected for same.

A 14x42 foot addition to the carpenter shop has been built; also a 12x16 foot addition to the oil house.

A water pipe consisting of 212 feet of four-inch pipe, and 288 feet of three inch pipe, has been laid from the water main to outside barn, for fire protection.

The 3-inch steam pipe which supplied the Ross slope engines was too small to carry the amount of steam required and they found it necessary to lay 1,000 feet of 4-inch pipe to those engines; also 600 feet of 6-inch pipe to carry exhaust steam to the return airway. This was done at our suggestion.

A slope is being sunk from Road 8 A in the 4 foot vein to reach the basin in the southeast corner of this property.

The Ross slope struck a roll which they are driving through on a 6 degree grade. This slope was driven in the rock a distance of 227 feet, and has about 150 feet more to go before reaching the coal.

The development of the Ross and 11 foot veins is progressing satisfactorily.

Five bore holes were put down from the surface to the 4 foot vein to test the rock cover of the same, along the D., L. and W., Bloomsburg R. R. Division.

A 7x12 foot rock tunnel was driven from Road 13 in the bottom split of the 11 foot vein to the top split, and a 7x8 foot air shaft, fifteen feet deep, was sunk from top to bottom split. This work was done to develop the top split of the 11 foot vein in this locality.

Harry E Colliery.—A new breaker has been erected on the easterly side of the old structure and is now practically completed. All the machinery is in place except the breaker and conveyer engines, which cannot be placed until the old breaker is abandoned, on account of obstructing the present loading tracks. The shaft head frame is framed and ready for erection. New self dumping cages have been made and delivered, ready for installation.

New cylinders, 26x48 inch, have been purchased to replace the present cylinders on the hoisting engines, which are 22x48 inches, and of sufficient power to operate the new cages, which are much heavier than the old ones.

A 20x22 foot fire proof brick building, with concrete floor and iron roof, has been erected over the Ross Slope engines which are located at the head of the air shaft and in close proximity to the supply and fan house, and replaces an old dilapidated frame building.

A 12x16 foot frame building used as a harness repair shop has been erected at safe distance from the barn, to replace a 10x20 foot frame building which stood so close to the barn as to be a menace in case of fire.

A 16x22 foot addition to the blacksmith shop has been erected owing to insufficient room in the original shop.

A new 16x10x18 inch duplex pump, built by the Scranton Steam Pump Company, was installed at No. 25 lift, Red Ash vein, and 2,300 feet of cast pipe laid from this pump to the foot of the shaft.

## IMPROVEMENTS

## KINGSTON COAL COMPANY

Kingston No. 2 Colliery.—Great attention has been given to the development of the water level coal in the mountain district.

Four tunnels have been driven from the surface cutting through the Ross and Red Ash veins.

A new coal road 3,000 feet long, also a self-acting plane connecting these tunnels to the main haulage road to No. 2 breaker.

A new concrete crib has been substituted for the wooden timbers at the permanent opening of No. 2 Slope.

450 H. P. return tubular B. and W. boilers have been installed at the old slope, and are enclosed in a corrugated iron-brick house.

Three tunnels have been completed in the Old Slope district between the Ross and Red Ash veins.

A new addition has been built to the east side of No. 2 breaker, new shakers taking the place of revolving screens.

A new 8 inch wooden pipe line 2,000 feet long connecting No. 3 shaft with No. 2 breaker.

A new system of fire protection and electric light.

A new washery has been erected independent of the breaker.

Kingston No. 4 Colliery.—Two new tunnels between the Bennett and Checker veins.

An additional pump and bore hole completed to Central pumping plant in Bennett vein.

A new 8x25 foot fan and expanded metal-concrete casing and house for same are in course of construction and will soon be completed.

300 H. P. return tubular B. and W. boilers added to main boiler plant.

The electric power plant has been increased by the addition of two 240 K. W. direct driven generators, new brick house enclosing same.

A number of changes and additions made to the breaker.

New addition to warehouse.

Through the generosity of the company a free library has been opened for the use of the employes, where they can spend their evenings in reading and studying. No books or magazines of a sectarian nature will be allowed in the library. Everything is free. Lectures are given on the "first aid to the injured" by Doctor Lake once a month. Also lectures are given on mining questions once or twice a month.

## TEMPLE IRON COMPANY

**Mount Lookout** Colliery.—The wooden cribbing in the Mount Lookout shaft, which is 14x22 feet, and 110 feet from the surface to top of rock, became partially decayed to a depth of 50 feet, which is the low water mark. The cribbing below this level is constantly wet and consequently well preserved. The problem of renewing this cribbing without a lengthy suspension of work was a serious one,

Exeter—Inside.—Preparations for the installation of a new pumping plant in the Pittston vein are being made. The air-motor haulage system was installed in the Checker vein. In the Marcy vein preparations are being made for the installation of air motor haulage.

A "Y" slope was completed in the Marcy vein in the west district and engine installed. Considerable changes in the extension of air haulage in the Red Ash vein were completed.

#### TEMPLE IRON COMPANY

**Mt. Lookout** Colliery.—A bore hole was drilled from the surface to the Marcy vein, through which a rope operates the Ross slope. A pair of 14x18-inch Flory engines was installed in the 22 x 22 foot brick building for power to operate the above mentioned slope. 516 feet of 8-inch steam pipe from the new boiler house, leading to both fans and both hoisting engines, were installed. This gives them two steam lines to both hoisting engines and fans. An 18 x 30-inch engine was installed to operate the North side fan, to replace the 13 x 16-inch engine formerly in use.

Forty Fort Colliery.—A 7 x 12 foot airway was driven from the Eleven Foot vein to the surface, in a 30 degree pitch, and a 7 x 20 foot ventilating fan, enclosed in a concrete building, installed on airway. A new brick engine house and new foundations were erected immediately in the rear of the old hoisting engine house, and the hoisting engines moved into the new building. A brick building was also erected to cover the breaker pumps.

Harry E. Colliery.—A Carpenter dust-removing system has been installed in the breaker and is giving very good results.

#### KINGSTON COAL COMPANY

No. 4 Breaker is being overhauled and rebuilt while mining operations are carried on as usual. The work is almost completed. The circular screens have been dispensed with and new mechanical pickers installed, dispensing with all boys under the age of sixteen years. A new brick-concrete wash house for the employes has been constructed, equipped with 100 steel lockers, 12 bath tubs, shower bath, hot and cold water and all conveniences. A new brick addition to boiler house has been completed and 600 H. P. additional B. & W. Water Tube boilers installed. The wooden building encasing the engines at No. 2 bore-hole and Cooper slope substituted with brick-concrete. The No. 1 shaft rock slope 450 feet long driven through roll in rock for the development of the Orchard vein under the Flats. A similar slope has been driven through the fault to reach the Bennett vein. A brick safety lamp station installed on the surface. An additional ambulance, with rubber tires, spring stretchers, etc., has been purchased. The school for the foreign miners was continued throughout the year. A duplex four stage centrifugal pump installed in the Orchard vein, inside slope. Concrete girders have substituted the old wooden timber at No. 4 shaft and turnout. A new Emergency Hospital at foot of the shaft. Three ventilating tunnels completed in Orchard vein. A new quintduplex electric pump, 1,200 gallons per minute, is being installed at the foot of inside Red Ash slope, discharging through 10-inch wood lined pipe 5,000 feet in length. Two new concrete-steel overcasts completed in Ross vein.

The mine tracks at No. 10 tunnel were rearranged so as to dump the coal from mine cars into railroad cars, to be transported to the William A breaker for preparation. Coal from railroad cars is dumped on to a 36 inch belt conveyor, about 90 feet long, which conveys coal into the mine cars near William A shaft.

An 8 inch hole, 150 feet deep, lined with 4 inch terra cotta pipe, was drilled from surface to Middle Red Ash near William A breaker, to run silt from the breaker into the mines.

The wooden cribbing and buntons at William A shaft were replaced by steel.

Seneca Colliery.—A new concrete mule hospital for the treatment of sick and injured mules was built near the outside barn. A concrete mule barn was also built at Pittston shaft. Steel cages were placed in the shaft to take the place of the wooden ones. An automatic electric fire alarm was installed.

A new 20 by 30 double geared engine was installed at the head of No. 9 slope; steam is exhausted through a 12 inch bore hole to the surface.

Bore holes were drilled from Marcy vein and Clark veins for drainage, eliminating small pumps.

A 10½ ton motor replaced the 7½ ton motor which hauls coal from Nos. 5 and 9 slopes to the foot of the shaft.

A motor barn was built in the Marcy vein, equipped with electric lights and chain hoist.

Shaft timbers at the Marcy vein landing in Twin shaft were renewed and concrete footing placed under cage fans.

Telephones were installed in different parts of the mines.

No. 11 tunnel was extended to Clark vein north of fault; No. 12 tunnel was driven from Marcy to Clark vein, to develop Clark vein north of fault and west of No. 11 tunnel.

No. 16 slope was driven from Marcy to Clark vein, to develop the Clark vein south of fault. A rock plane for return was driven back to Marcy vein.

A 9 inch by 10 inch triplex electric pump was installed in No. 12 slope, Clark vein.

Motors were installed in the Fifth and Sixth veins to handle coal, replacing mules. A concrete barn to accommodate 20 mules was built in the Sixth vein.

Stevens Colliery.—Inside: Motor road built and motor installed in the Marcy vein, to handle the coal west of slope.

Tunnel was driven from Marcy vein to develop Top Marcy.

Outside: Self dumping cages were installed in the shaft and the coal dumped into railroad cars and transported to the William A breaker for preparation.

Conveyor line built to run culm bank through the old breaker.

#### TEMPLE IRON COMPANY

**Mt. Lookout** Colliery.—A brick oil house, 18 feet by 19 feet, with concrete floor and iron roof, has been erected, and is equipped with Bowser oil tanks.

A concrete wash house, 17 feet by 38 feet, with iron roof, has been erected and equipped with 93 sheet steel lockers.

A vacuum system was installed for removing the ashes from the boiler house. This consists of a concrete ash bin, 16 feet by 16 feet by 26 feet high, from which the ashes are exhausted by a No. 6 Root



blower, driven by a 16 by 16 inch automatic engine, and an 8 inch cast iron pipe used to convey the ashes from the ash pits to the bin. The ashes in this bin can there be loaded into mine cars or run through a set of crushing rolls that have been installed for that purpose, and then flushed into the mines. A 10 inch bore hole was sunk from the surface to the Pittston vein, a depth of 266 feet, for this purpose. The air, which is discharged from the ash bin, is also used for blowing the fires under the boilers.

Eight new plunger jigs were installed in the breaker, six of which were to take the place of old jigs that were worn out.

A 7 by 14 foot rock slope was sunk on a 25 per cent. dip, a distance of 356 feet, from the Marcy vein to the Ross veins on the west side of the property, to develop the Ross veins in that vicinity.

Forty Fort Colliery.—A new barn with a concrete floor, with a capacity for 65 mules, has been erected in the Eleven Foot vein.

A balance plane, 2,300 feet in length, has been installed to handle the coal in the Eleven Foot vein above the shaft level.

A pair of 10 by 12 inch hoisting engines was placed on the west side of the Eleven Foot slope to sink a new slope to the land line, a distance of 950 feet.

A 10 by 12 by 16 inch Jeanesville pump was installed at the foot of the Ross slope, replacing a No. 8 Knowles, which was inadequate to handle the amount of water.

Harry E Colliery.—An 8 inch bore hole was sunk from the surface to the Red Ash vein, a depth of 530 feet, and a 6 inch steam pipe laid from the boiler house to this bore hole, a distance of 1,880 feet, to supply steam to the lower workings of the Eleven Foot vein, and also to the Red Ash vein.

The Six Foot vein workings at this colliery, which were abandoned some years ago on account of the large amount of water flowing into the workings, have been reopened and the water removed. The slope in this vein for a distance of 3,000 feet has been relaid with 40 pound rails, and a 14 inch by 36 inch hoisting engine is used to operate it.

The old air shaft has been reopened and a 13 foot diameter fan installed.

A small area of Four Foot vein overlies these workings, and a 7 by 12 foot rock plane was driven from the Six Foot to the Four Foot vein, a distance of 80 feet. An 8 by 10 foot air shaft was sunk from the surface to the Four Foot vein, a distance of 84 feet.

A mine track has been laid from the mouth of the Six Foot tunnel to connect with the Harry E mine tracks leading to the breaker, a distance of 1,700 feet. This coal is conveyed from the tunnel to the breaker with a 15-ton steam locomotive.

#### KINGSTON COAL COMPANY

Kingston No. 4 Colliery.—The breaker has been equipped with a new "Carpenter" galvanized pipe-water column spray dust eradicator system. A brick extension completed to wash house, entire building now being equipped with two hundred lockers, bath tubs, shower baths, etc.

A brick waiting station completed for miners at the head of the No. 4 shaft. Completed two concrete powder houses, one new carpenter-blacksmith-car shop and a new warehouse ambulance shed.

this electric equipment was to abandon the boiler and compressed air plant, which supplied the lower workings of Forty Fort and Harry E collieries with power, and which was very expensive to operate and maintain.

The barns, engine rooms, pump rooms, etc., inside are constructed of concrete and steel and are strictly fireproof. A shaft, 6 by 6 feet and 50 feet deep, was sunk between the overlap in Four Foot vein, connecting No. 3 slope Four Foot workings with South slope Four Foot workings. This is an additional opening for the South slope section and will afford more efficient ventilation for this section. A rock plane was driven on a 30 degree pitch between the Eleven Foot and Six Foot veins, a distance of 210 feet, for the purpose of making an additional opening for the Six Foot vein workings.

Outside: No. 1 air shaft was retimbered, the airway between the shaft and fan rebuilt, and the fan and fan house substantially repaired. Twelve new jigs of the plunger type were installed in the breaker. The Jackson tunnel, which is used as a waterway for the Six Foot old workings above the shaft level, was opened up and retimbered a distance of 257 feet. This tunnel is now 8 by 18 feet. A telephone system was installed connecting the office outside with the Eleven Foot, Six Foot and Four Foot veins.

Harry E. Colliery—Inside.—One 8 by 12-inch duplex double-acting plunger pump, operated by a 20-horse power electric motor, was installed in a fireproof building of concrete and steel on No. 38 lift, Red Ash vein, and two 8 by 12-inch duplex double-acting plunger pumps are operated by 75-horse power electric motors, were installed on No. 32 lift in a building constructed of concrete with steel for roof supports. Installed one centrifugal pump, with 3-horse power electric motor in No. 24 lift dip; and three 22-horse power electric hoists, one in No. 28 lift, one in No. 24 lift and one in No. 24 intermediate lift. 3,210 feet of extra heavy cast iron flanged pipe laid from No. 19 to No. 32 lift; 750 feet of 8-inch wrought iron pipe laid from No. 32 to No. 38 lift; 2,000 feet of 6-inch wood pipe laid to carry silt to the lower workings in Red Ash vein. A pair of 13 by 18-inch hoisting engines installed at the head of Eleven Foot slope to replace the old engines, which were inadequate to do the work. A rock plane, 6 by 8 feet, 90 feet long, was driven on a 45-degree pitch between Six and Four Foot seams, for a second opening and to improve the ventilation.

All engine houses, stables and pump rooms inside are constructed in a substantial manner of concrete with steel supports.

Outside: A contract was made with the Luzerne County Gas and Electric Company to supply Harry E. and Forty Fort collieries with electric current. A brick building 12 by 12 feet was erected over a bore hole formerly used to supply the Red Ash workings with compressed air, for a sub-station where the Electric Company delivers the current at a voltage of 6,600 volts and it is transformed to 440 volts for use at the colliery. A similar sub-station was erected in the old compressor house to supply the Forty Fort workings with power. A telephone system was installed connecting the outside with the Red Ash and Ross veins.

#### MT. LOOKOUT COAL COMPANY

Mount Lookout Colliery.—Inside: All timber supports were removed from the main pump room in Pittston vein and replaced with



H section steel columns and concrete. A new mine hospital was constructed in Marcy vein of fireproof material and fully equipped with the necessary appliances. A Jeffrey electric under-cutting machine has been placed in Ross vein, with very satisfactory results. A mule barn, with concrete floors, steel mangers and cast iron feed boxes and water troughs, was constructed in the Marcy vein, to accommodate 32 mules.

Outside: A pair of 14 by 20-inch Vulcan hoisting engines installed on the surface to operate Ross slope inside. The engines replace the Flory engines formerly used, which were inadequate to do the work. A complete telephone system was installed connecting the outside office with all the veins and slopes.

#### PLYMOUTH COAL COMPANY

Black Diamond Colliery.—Inside: Built concrete and steel engine room at the head of the slope in Red Ash vein and concrete and steel stable in Red Ash vein. Retimbered Red Ash plane engine house with steel timbers and iron lagging. Built concrete and steel stable in Ross vein; concrete and steel engine room at the head of the slope in Ross vein; concrete and steel pump room in the Bennett vein, and concrete and steel stable in Cooper vein. Installed a 24 by 10 by 24-inch Scranton steam pump in Bennett vein and a 16 by 8 by 18-inch Scranton steam pump in Red Ash slope; also one 5-ton General Electric Company motor with the necessary wiring and bonding to operate it in Bennett vein.

Outside: Installed one General Electric continuous current, 100 K. W. 400 amperes, 250 volt generator, driven by a General Electric 60 cycle 150 horse power 440 volt motor. An electric power house constructed of brick, 26 feet by 14 feet by 12 feet, was also completed. Installed one 500 horse power two-drum water tube Babcock and Wilcox boiler, enclosed in a fireproof brick boiler room with corrugated iron roof and iron doors. Constructed a pump room of concrete and steel with corrugated iron roof and door. Installed one 16 by 8 by 18-inch duplex Scranton steam pump for boiler feed. Installed three Anthracite Spiral slate-picking machines and one Emery slate-picking machine in breaker.

#### DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Pettebone Colliery.—Inside: The second opening from Hillman vein to Kidney vein, which was mentioned in last year's report, has been completed. The work of rebuilding mule barns, pump rooms, hoist rooms, etc., with incombustible material, is completed.

#### EAST BOSTON COAL COMPANY

East Boston Colliery.—Inside: The foot of the shaft was made fireproof by the use of concrete and steel supports. The mule barn, hospital and pump room in Red Ash vein were built of concrete with steel supports. The slope engine room was also built of concrete with steel supports. There were 43 sets of steel timber placed in Red Ash and Ross veins to take the place of wood. The Ross slope engine

one room for keeping Wolfe safety lamps and electric hand lamps and the other for storing the mine rescue apparatus. This room serves as a First Aid Hospital, complete with operating table, surgical appliances, et cetera.

#### FORTY FORT COAL COMPANY

Harry E. Colliery.—Inside: Installed a pumping station in the Six Foot vein. Drilled two bore holes for the purpose of furnishing steam to the pumps and discharging the mine water. A 400-gallon motor driven Alberger turbine pump and a 200 gallon Aldrich triplex electrical pump were installed in the Six Foot vein. 10,000 feet of 1/0 copper wire were installed to transmit power for the operation of these pumps.

Installed a 7-ton Morgan-Gardner electric locomotive and a 6-foot Morgan-Gardner coal cutting machine; also a 200 K. W. Westinghouse induction motor generator set in a fireproof building, 15 by 15 feet, transforming 440 volt alternating current to 250 volt direct current.

Installed a pair of 10 by 12 inch Flory engines to operate No. 2 slope, Top Ross vein.

Outside: Built a 12 by 12 foot brick addition to the transformer station to accommodate additional transformers; also a 12 by 12 by 18 foot brick building at the breaker for a transformer station to furnish power for the Six Foot slope.

Forty Fort Colliery.—Inside: Drove a 6 by 8 foot second opening and manway 105 feet from the Top Ross to the Bottom Ross vein, on an angle of 45 degrees. Installed a pair of 10 by 12 foot Flory engines on the rock slope to drop coal from the Top Ross vein to the Bottom Ross vein; also a pair of 14 by 18 foot Flory engines in the Six Foot vein to operate No. 2 slope in the Eleven Foot vein by running a rope down a borehole.

Outside: Built an addition 8 feet 6 inches by 52 feet to the boiler house and added one 500 H. P. Sterling boiler to the plant. Extensive breaker repairs and improvements were also made.

#### MT. LOOKOUT COAL COMPANY

Mt. Lookout Colliery.—Inside: Installed a 28-A Jeffrey 6 foot coal undercutting machine and constructed a fireproof air bridge in No. 9 slope.

#### DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Pettebone Colliery.—Inside: Completed sinking a rock slope from the Bennett vein to the Red Ash vein. The work of sinking a slope from the Cooper to the Red Ash vein, on the south side of No. 1 shaft, is underway. Preparations are being made for second openings by tunnels from the various seams cut by No. 12 slope from the Bennett vein to the Red Ash vein.

#### 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 22 and 23. The Board of Examiners was composed