

Improvements by the Lehigh Valley Coal Company.

At the Franklin colliery a new tunnel has been driven from the Bottom Split of the Red Ash to the top split, a length of 210 feet, and a sectional area of 7×12 feet.

Improvements by the Alden Coal Company.

In the Red Ash seam of the Alden mine, a tunnel was driven across an anticlinal to the basin north of the present workings. It has an area of 90 square feet and is 1,400 feet in length. This is expected to open an extensive area of a good quality of coal.

Improvements by the Parrish Coal Company.

The underground slope of the Baltimore seam in the Parrish colliery has been extended a length of 1,450, feet making it a total length at present of 2,150 feet. It has a grade of about 6½ degrees and a sectional area of 7×12 feet.

Improvements by the Hillman Vein Coal Company.

This company has driven two tunnels, one from the Hillman to the Kidney seam, and the other from the Hillman to the Abbott seam. The former is 170 feet in length and the latter 337 feet. The sectional area of each is 7×12 feet.

Improvements by A. J. Davis.

At the Warrior Run colliery, a new pair of first motion hoisting engines have been erected. The cylinders are 30×48 inches, and the Cone Drum is large enough to carry 2,500 feet of 1.5 inch rope. This was procured to take the place of a single geared engine and is an effective improvement. A short tunnel was also driven from the B to the C vein, a length of 120 feet, having an area of 90 square feet.

Improvements by the Newport Coal Company.

At the Lee colliery two new drifts were opened to the Red Ash seam, and a new slope was driven to a length of 546 feet. It has a varied pitch, the steepest being 70 degrees.

NEW SHAFTS IN PROGRESS OF SINKING.

The Maxwell shaft No. 20, of the Lehigh and Wilke-Barre Coal Company, after being sunk to the rock, was walled with excellent mason work up to the surface. The size of the shaft inside of the walling is 54×12 feet, and at the end of the year 1892 it was at a depth of 134 feet. Workings are being opened ready in the Jersey mine to run coal for this shaft, and the construction of a breaker is in progress.

The Delaware, Lackawanna and Western Railroad Company is sinking three new shafts in Hanover township. The first is named Bliss,

of compressed air or electricity will in time banish the steam pipes from the mines. The Kingston Coal Company, at their Edwardsville collieries, the Plymouth Coal Company at their Dodson colliery, and the Lehigh and Wilkes-Barre at their Nottingham colliery, are running their underground pumps with compressed air, and the Delaware, Lackawanna and Western Railroad Company at their Woodward colliery, run the underground pump with electricity. Thus, it will be seen that the condition of the underground workings of the mines is progressing continually toward a safer and better condition of things.

RECORD OF IMPROVEMENTS FOR 1893.

Some important improvements were made at several of the collieries during the year 1893, which are described in detail in the following statement:

Improvements by the Lehigh and Wilkes-Barre Coal Company.

In the Hollenback No. 2 colliery, a tunnel was driven through a fault in the red ash seam. It is 200 feet long and 7x12 feet in size. At the No. 5 South Wilkes-Barre colliery a tunnel was driven from the Baltimore to what is designated as the Stanton seam. It is a horizontal tunnel, 700 feet long and 7x14 feet area. A second opening was driven for this seam also, rising on a grade of 7 degrees. It cut the seam at a length of 500 feet and it has a sectional area of 165 feet.

Another tunnel was driven from the Kidney to the Hillman seam, a length of 475 feet, and 7x12 feet area. These tunnels have opened a large area of coal for this colliery. The sinking of a new air shaft for this mine was completed to a depth of 90 feet by the end of the year. Its size is 12x37 feet and was sunk for the sole purpose of increasing their already large volume of ventilation.

At the Maxwell colliery, preparations are made to have work ready by the time the new shaft is sunk to the Baltimore seam. This work is done from the lower lifts in the Jersey No. 8 colliery. Tunnels were driven from the two lower lifts of the Baltimore seam to the red ash. Each of these tunnels will open the Ross and the red ash seams, so that when the shaft is completed to the Baltimore seam enough workings will be ready opened to furnish a considerable quantity of coal.

The sinking of the Maxwell shaft was commenced in the year 1892, and at the close of that year it was down to a depth of 134 feet. During the year 1893 the sinking was suspended for several months, but at the close of the year it was down a depth of 400 feet. Its size is 12x54 feet.

A new slope was sunk a short distance west of the shaft from the surface to open work on the Hillman seam. Its size is 6½x12 feet,

and at the end of the year it was driven to a length of 440 feet on grade of 20 degrees.

This will also open some coal for the Maxwell breaker in addition to the production of the shaft.

The woodwork of the Maxwell breaker is completed ready to be equipped with machinery. It will be ready to prepare coal for the market by the time the shaft is completed.

At the No. 9 colliery, Sugar Notch, the underground slope was extended a distance of 300 feet where a new lift was opened. A rock tunnel was driven on a rise of 45 degrees, having an area of $12\frac{1}{2} \times 8\frac{1}{2}$ feet, and a length of 104 feet, for the purpose of improving the ventilation.

At the Lance No. 11 colliery important improvements are in progress and some were completed. A new underground slope was sunk, extending farther south than the bottom of the old slope. It is 800 feet long on a grade of 8 degrees and opens a considerable area of coal which has been hitherto unavailable.

An air passage was driven, also, through rock a distance of 200 feet, having a sectional area of 84 square feet.

A new air shaft is in progress of sinking for this colliery for the purpose of enlarging the volume of air. Its size is 12x30 feet, and it was at a depth of 300 feet at the end of the year.

At the Nottingham colliery a great improvement has been made by the introduction of compressed air to run the underground pumps, instead of steam. There are 8 pumps used in this mine, and the steam necessary to run them heated the air to an almost intolerable degree. The two duplex Ingersoll air compressors, with Corliss engines, were located on the surface. Their size is 28x34 $\frac{1}{4}$ x48 inches, having a capacity for producing 11,000 cubic feet of free air per minute. One pair furnishes sufficient air to run the 8 pumps and one is operated during the day and the other during the night. The farthest pump is at a distance of 7,200 feet from the compressors. The air pipe to the first pumps is 14 inches diameter, and from there to the other pumps 12 inches. They are working satisfactorily, and the temperature of the mine ventilation has been greatly reduced.

At the Wanamie, No. 18, colliery a short tunnel was driven from the Baltimore to work the Cooper seam. Its size is 7x12 feet, and its length 175 feet.

Improvements by the Delaware and Hudson Canal Company.

At the No. 2 Baltimore colliery a new underground slope was driven a distance of 450 feet on a dip of 20 degrees to work the coal of the red ash seam below the level of the shaft.

At the No. 3 Baltimore they are sinking an underground slope on the red ash seam and it was down a depth of 600 feet at the end of

part of these old workings, the force of the air from said fall burst the brick walls about the shaft, allowing this confined gas to escape up through the shaft. During the winter of 1866 and 1867 I was sent again to Buttonwood by J. T. Griffith to take out the pumps, column pipes and pump rods. This was accomplished without any loss of life and but a slight injury to one person. All this work was done without even the aid of a safety lamp—all by sense of feeling and knowing the place perfectly well.

Of the men with me doing this work, I can think of only two, the late John Lewis, Newtown, now Rolling Mine Hill, Wilkes-Barre, and the late William Richard, of Warrior Run, then of Wilkes-Barre.

I think the shaft was sunk in 1859 and 1860.

Very truly,

JAS. E. RODERICK.

The Revival of the Chauncey Colliery.

The name of this colliery reappears this year among the list of producing collieries. It was abandoned at the close of 1886, the old breaker rotted down, and from appearances, it was permanently abandoned. The Reynolds and Moyer Coal Company, Limited, leased the culm bank and erected a separator. Subsequently a lease on the coal remaining in the old mine was obtained and a small breaker was erected, which started to ship coal at the end of the year 1894. The chief part of the coal production reported this year came from the culm bank, but the old tunnel is being reopened and also the workings of the Ross seam. A small fan was erected to produce ventilation, and the mine will soon be in shape to furnish coal.

The Maxwell Colliery No. 20.

This is a new colliery being opened by the Lehigh and Wilkes-Barre Coal Company. The sinking of the shaft was started in 1892. Its size is 54x12 feet. In 1893 the sinking was suspended, but it was resumed after a few months. At the end of 1894 the shaft had passed the Baltimore seam and was at a depth of 820 feet. The depth to the Baltimore seam is 648 feet. From this point to the Red Ash seam the size of the shaft is reduced to 37x12 feet. Connections are already made to the Baltimore seam workings, from which tunnels have been driven to work the upper lifts of the Ross and Red Ash seams.

A slope has also been sunk from the surface to a depth of 635 feet on the Hillman seam.

The immensely large breaker is completed and fully equipped with machinery ready to prepare and ship coal as soon as the shaft is completed.

Rowland Thomas, Nanticoke.
Robert Smith, Nanticoke.
Edwin W. Davies, Nanticoke.
Thomas Bailey, Glen Lyon.
John Abrams, Glen Lyon.
John J. Griffiths, Luzerne.
Richard McDonald, Parsons.
Daniel C. Richards, Wilkes-Barre.
Andrew Cox, Wilkes-Barre.

Thirty of the applicants for assistant foreman certificates were recommended as having passed a satisfactory examination and received their certificates.

Colliery Improvements for 1895.

Notwithstanding the continued depression in the coal trade through the year, important improvements were made by several of the coal companies. A detailed account of which is given:

Lehigh and Wilkes-Barre Coal Company.

At several collieries of this company minor improvements were made which are not noted, but the important ones are described.

At the South Wilkes-Barre Colliery.

Second opening was driven and completed for the No. 2 tunnel. One new slope 500 feet long having an area 7x12 feet; grade, 12 degrees. One tunnel from Hillman to Hillman seam, 762 feet long, 7x12 feet area. One new gravity plane 200 feet long; grade, 20 degrees.

The Maxwell No. 20 Colliery.

This shaft was completed to the Red Ash seam, the lowest seam in the coal measures. Its size is 12x54 feet to the Baltimore seam, and from there to the Red Ash it is 12x37 feet. Its depth to the tracks at the Baltimore seam is 650 feet. The shaft is equipped with two cages to hoist coal from this part, and two more cages will shortly be put in to hoist from the Red Ash seam a depth of 1,048 feet. A full description of the plant and outside arrangement is found in the following furnished by Mr. Herring, outside superintendent:

Maxwell No. 20 colliery which has recently been put into operation, probably embodies more new features in the construction of its breaker and equipment and the development of its underground workings than any other colliery in the anthracite coal fields. A minimum cost of operating has been the chief aim in all the work

done at this colliery, this consideration being foremost in the adoption of methods of mining, the arrangement of the underground and surface haulage and the equipment of the breaker. While the new Maxwell shaft was being sunk, the Jersey No. 8 workings adjoining this colliery were extended so that when the new shaft was completed, all important gangways and airways, planes and gravity roads were ready for the new operation.

As Jersey No. 8 breaker has been abandoned, all coal hereafter mined from the No. 8 workings will be prepared at No. 20 breaker; this tonnage, in addition to what can be mined in the vicinity of the new shaft, ensures for the No. 20 breaker a larger output than that of any of the other collieries of the company. A very large body of coal lies in the immediate vicinity of the new shaft and as facilities for hauling it are simple, effective and economical, the inside mining expenses should be reduced to a minimum.

The timber work of the shaft is unusually well constructed, and the guides are remarkably true, so that the hoisting is attended with no swinging or jarring and can be performed with great speed and safety. The shaft hoisting engines, a pair of large 28x60 inches of the Corliss type with cast iron grooved drums, constructed by the Vulcan Iron Works of Wilkes-Barre, Pa., do their work in a most satisfactory manner, and with a steam consumption of probably not more than two-fifths of the quantity which would be required for this work by the old style slide valve engines. Notwithstanding that the distance from the foot of the shaft to the surface is 650 feet, these engines can hoist a car of coal every 25 seconds, the time consumed in the actual hoist being but 18 seconds. The engines are arranged to cut off at one-third stroke after the second revolution, attaining sufficient momentum about the middle of the hoist to carry the loaded car the balance of the distance without a further use of steam.

The transportation of the coal on the surface from the mouth of the shaft to the breaker, and the return of the empty cars, is accomplished by gravity roads and automatic car hoists. An improved form of dumping cage is used in elevating and dumping the coal into the breaker, the trouble experienced with the old style cage from frequent dropping of parts of the contents of the car down the shaft, being entirely overcome in the new form. By means of a change in the bottom of this cage all pieces of coal falling from the car are caught in a side chute and dumped into the breaker with the other coal. Five mine cars per minute have been dumped at the top of the breaker with three men at the bottom to handle the cars and two men at the top, one of the latter in addition performing the duties of a "docking boss." Ample provision has been made in the equipment for the reduction of the coal to small sizes, owing to the in-

creasing demand of the market for these sizes, and in order that this extra work required of the breaker may not interfere with the output of the colliery, picking chutes to remove the slate and bone from the coal before it enters the rolls, with extra rolls to break this coal separately and screens for sizing have been provided. As the impurities in the coal are by this provision removed early in the preparation, very little attention need be given the coal after it is sized. The bulk of the mine car material, broken to stove sizes inclusive, is sized and prepared in the usual manner by broken and main screens and their picking chutes. For the small sized material as it comes from the mine cars, including the flat pieces of egg, stove and smaller sizes, special screening surface has been provided, ranging from egg to No. 2 buckwheat screens, with intervening picking chutes, rolls and elevators for breaking the flat pieces of all sizes and returning them to the proper screens for sizing. The slate and bone in the egg, stove and chestnut sizes, in this division of the breaker are removed by automatic chute slate pickers, which can be adjusted to suit the quantity of coal passing over them, and also to remove any desired percentage of bone and slate. They are a great saving in labor, and also a great gain in preparation, as they do their work very satisfactorily and with but little loss of coal going with the slate. In order to secure a large output, together with satisfactory preparation, the number of courses or divisions through which the coal passes has been increased over that of the other breakers of the company, and as a result the chutes are not overburdened with heavy rushes of coal and the picking is rendered less difficult. Arrangements are also made for taking tests on the product of each division before it enters the pockets, and defective preparation can be readily detected and remedied.

The frame work of the breaker is white pine 7x14 inch timber, double posted, and bolted together with break joints, the posts running from the sills on the foundations to the cap at the top of the breaker. There are no intermediate caps. The breaker machinery, which is unusually strong and durable is run by an automatic cut off engine, costing probably 20 per cent. more than the style of engine heretofore used for this purpose, but undoubtedly the more economical on account of its low steam consumption. The full boiler pressure acts on the piston of the engine, and a shaft governor regulates the distance the steam follows the piston in its movements, allowing the steam in the cylinder to expand after the supply has been cut off.

The boilers at this colliery are all of the high duty water tube type, and supply nearly three times as much steam for a given quantity of coal as the old type of cylinder boilers, thus effecting a great saving in the cost and operation of the plant. The exhaust steam from the breaker engine is used for heating the breaker in rather a

different manner than that heretofore employed. There is no back pressure on the piston caused by forcing the steam through the breaker, the pipes from the exhaust being very large and the steam conducted at once to the highest point required. From this point the steam travels downward through the system of pipes, with the condensed water, thus utilizing the heat in the latter, as well as the latent heat in the steam. The water which collects in the pipes is let off by traps which adjust themselves to any pressure, the heating pipes in the breaker by this arrangement taking the place of surface condensers and assisting, instead of retarding the breaker engine in its work. The pipes are also connected to a pipe direct from the boilers by means of an automatic reducing valve, which is set to supply steam from the boilers when the pressure in the pipes has fallen 8 pounds below atmospheric pressure. This arrangement provides for the heating of the breaker when the breaker engine is not in service.

Operations at the new colliery were commenced on the 16th day of December, 1895, and up to the present time no changes throughout the entire breaker have been required. The daily output is not yet up to the maximum, but before a great while it is expected that the colliery will be able to ship 4,000 tons daily.

No. 9 Sugar Notch.—One tunnel through rock from Twin to Ross seam 351 feet long, 7x12 feet area.

Lance No. 11.—Two new Sterling boilers, 125 horse power each. A thirty-five foot fan is in course of erection on the new aid shaft which was sunk in 1894.

Improvements by the Delaware and Hudson Canal Company.

Baltimore Tunnel Colliery.—A new gravity plane was made extending towards the outcrop 600 feet.

No. 2 Baltimore Colliery.—The inside slope was extended to a length of 1,000 feet and is being continued.

Boston Colliery.—The new shaft was completed to the Red Ash seam which was cut at a depth of 475 feet. Its size is 12x33½ feet.

No. 3 Plymouth.—A new breaker to replace the structure which was burned on November 15, 1894, was finished by July, 1895, in which month it started to prepare coal, and worked seven and three-fourths days. It was erected about 300 feet west of the location of the old one which is a very desirable improvement. A pair of first motion hoisting engines with a brick engine house has been erected at the shaft, and the whole plant and outside arrangement is now in a satisfactory condition.

A new breaker is in course of erection at the new No. 5 shaft which was sunk and completed last year. The shaft is equipped with machinery and they are now commencing to drive gangways in the Red Ash seam.

way, the top of the manway, slope and slope airway with brick walls. The location of each wall is marked on map by C. This was all effectively done in twenty-four hours after it was decided upon. The Mine Inspector was present, watching the work day and night, and rendered all the assistance in his power, and, fortunately, although dangerous work was done, no one was injured. There is an immense area of workings closed in with that of the fire area, but the fire was of sufficient extent to produce enough non-combustible gases to fill the whole in a few hours. The complete combustion of one ton of coal produces more than three and a half tons of carbonic acid gas, which, at the mean temperature of 60 degrees and mean pressure of 30 inches, would be about 56,564 cubic feet. Besides this, 154,757 cubic feet, of nitrogen is released, producing for each ton of coal consumed, about 211,321 cubic feet of non-combustible gases. Where a fire is large and burning freely, every part of the workings is soon filled with the non-combustible products of the fire and as it is filling, the air is being driven out. Carburetted hydrogen gas is also non-combustible when not mixed with air, and serves to smother a fire as effectively as carbonic acid or nitrogen. When the carbonic acid is all driven out and the workings filled with carburetted hydrogen gas unmixed with air, the fire cannot burn for the presence of this gas proves that the fire has ceased burning, and that carbonic acid is no longer produced, but there are good reasons for believing that a mass of red hot coals retain heat enough for several months to rekindle it on the admission of air in a mine where its surrounding gases are stagnant. There is nothing to absorb or carry the heat away, therefore the air should not be admitted for at least five or six months after a fire has been isolated and enclosed from the air. At this writing the Empire fire has been shut in for eight months and it is not yet opened. If this method proves effective to extinguish the fire at the Empire, of which I have no doubt, it would certainly prove effective in all mines excepting workings near the outcrops or surface, where air may be forced in through the earth by the pressure of the atmosphere.

At the Empire mine, a vast area of workings had to be enclosed with the fire, and there is only a small quantity of carburetted hydrogen given off in the workings, both being highly disadvantageous for effective suffocation of the fire. So far the indications are that the workings are densely filled with non-combustible gases, but there is no heat nor any indication of the fire burning, and no indications of the existence of fire has been seen since it was sealed in.

The Maxwell No. 20 Mine Fire.

At about 8.30 A. M., June 22, 1899, a small body of gas was ignited in a breast on the red ash seam of the Maxwell mine, and two men

were more or less severely burned. The seam at that place was faulty and the coal was soft and shelly. The explosion left gas feeders on fire, which in a short time ignited the loose coal.

While efforts were being made to restore the airways and to get water to fight the fire, a second explosion took place more fierce than the first, and this frightened all the men out. The officials were nearly all at the Empire fire, but they were called to this mine as speedily as possible. The fire was in one or two breasts, but a large body of explosive gas had accumulated in a number of other places near by. At about 5 P. M. it was discovered that a miner, Antoni Maksenovitch, working one of the outer breasts was missing and had not come out of the mine. He was called out by his laborer immediately after the occurrence of the explosion, but failed to come. The lights having been blown out by the concussion, everybody groped their way out without light except him, and nothing was said about him by his acquaintances until about 5 P. M. His body was found lying behind the brattice a short distance down from the face of his breast, he having been suffocated by the after-damp. He worked in a breast a long distance away from the seat of the explosion. Owing to the evident probability of another explosion taking place, and lest some of the workmen should be injured thereby, it was decided to shut the air off from a section of both the gangway and airway by flushing them full of culm at a large reserve pillar a long distance back from the seat of the fire. This was accomplished within two or three days, and it has been left there to the present time, a period of eight months. There are conditions where a passage can be closed by flushing dirt or culm without exposing the men to danger and such conditions existed here, but it has the disadvantage of being slow and gradual, and to reduce a current of air gradually in a gaseous mine having a fire burning is almost certain to create a large body of explosive gases and to produce explosions, yet it is not known that any explosion took place here. The reduced air current allows gas to accumulate and at the same time supplies the air necessary to make it highly explosive, which, if ignited by the fire, causes destructive explosions. Again, to remove the culm which invariably is spread over a long distance is slow and expensive, and besides that, the air is gradually admitted, and if there should be even a small red hot piece of coal it would be fanned to a live fire before the volume of air was restored in sufficient quantity to dilute the gases and assure safety. Where a mine or part of a mine is sealed by flushing, the time of greatest danger is when it is being reopened. At least it is a period of a great deal of uncertainty and which lasts for several days, but with doors well fitted, the air can be cut off instantly and admitted again just as quickly. Where the air can be cut off effectively at once, the chances for an explosion are

much less, and especially is this the case in mines where a large quantity of marsh gas is emitted. The gas is emitted at a higher rate than the velocity of natural diffusion and it accumulates in a pure unmixed state, which is not explosive and does not support combustion. Therefore, the probability of its accumulating around a fire without exploding, is much greater than it would be if the air was gradually reduced and mixed with marsh gas.

The Dodson Mine Fire.

At about 6.15 A. M., July 13, the Dodson breaker of the Plymouth Coal Company, at Plymouth, was discovered to be on fire. In a short time the whole structure, including the shaft tower and engine house was aflame and was totally consumed. The shaft cages, sheaves and a mass of burning timber fell down the shaft, which set the pump room and timber at the foot also on fire. Streams of water were poured down the shaft to extinguish the fire below, but the air current caused by the falling water drove the fire into the workings. There were fifteen men in the mine, but they came out safely through the Gaylord mine. Soon after they had started out, the burning shaft became the upcast and the fan was stopped. At this time the fire bosses went in from the Gaylord mine and found the bottom of the shaft a raging mass of fire. They came out and recommended pouring water down and when this was done the shaft became a downcast and the mine was soon filled with smoke. Later the water was stopped and an attempt made to go into the mine from the Gaylord workings in the Ross seam. On reaching a rock slope sunk from the Baltimore to the Red Ash, they found the slope full of fire damp, being drawn up from the Red Ash seam, and they hastily returned and reported the situation. At 9.30 P. M. a shock, as if an explosion had taken place inside, was felt on the surface.

The following day, July 14, at a conference of the officials and mine superintendents, it was determined to flood the mine with water. While the preparations for flooding were going on, the shaft and all other openings to the mine were hermetically sealed, and on July 17 the pouring of water down was stopped. The whole mine filled with non-combustible gases in a few hours. On July 19 explosive gas appeared at all the stoppings, which showed that carbonic acid was no longer produced, and that combustion has ceased. The carburetted hydrogen had no air intermixed and so was not combustible. On July 30, at 4.30 P. M., thinking the fire extinguished, the stoppings at the Gaylord mine were reopened and the Dodson fan was put in operation to ventilate the mine. On August 2 explorers entered the mine but failed to go to the seat of the fire owing to falls of top and explosive gases. On August 3 a second exploration discovered a

Rock airway, Baltimore to Five Foot, 20 yards. Tunnel from bottom to top split red ash, 10 yards. Steel head frame at shaft.

Jersey Colliery.—Rebuilt Jersey breaker to screen culm banks of collieries No. 6 and No. 8.

Sugar Notch Colliery.—Steel head frame at shaft. New trestle from head frame to breaker.

Lance Colliery.—Tunnel from Cooper to Five Foot, 55 yards. Tunnel from Baltimore to Cooper, 35 yards. Rock airway, Baltimore to Cooper, 35 yards. Pair of 18x30-inch engines erected at No. 2 airshaft for operation of Red Ash plane.

Wanamie Colliery.—Tunnel, Baltimore to Cooper, 20 yards. Annex to breaker to secure better preparation and increase output. Two hundred and fifty horse-power Babcock & Wilcox boilers.

Maxwell Colliery.—Rock airway, Ross to Baltimore, 50 yards; 30x48-inch Corliss engines for Red Ash shaft. Two hundred and fifty horse-power Babcock & Wilcox boilers.

Improvements by the Delaware and Hudson Company, 1899.

Baltimore No. 2 Colliery.—No. 5 slope in Red Ash vein now down 1,300 feet and probably in basin; 820 feet driven in 1899. No. 1 tunnel from bottom split, Red Ash to top split, 307 feet long. Rock return airway for No. 1 tunnel, 87 feet long. One Ingersoll air compressor 20x18x30 inches. Air used for 10x12-inch engines on plane in Red Ash vein carried down bore hole 630 feet long at Pine street.

Baltimore Tunnel, No. 4 Shaft.—Completion of No. 5 slope in Red Ash vein, 1,600 feet long. Now in operation. Engines, pair 18x36-inch on surface, in stone engine house, 20x40 feet. Rope runs through bore hole. Boiler plant, three locomotive type boilers, 60x23 feet 3 inches in brick boiler house, 46x60 feet. This plant displaces the twelve cylinder boilers at mouth of tunnel and one locomotive boiler at Pine street. No. 6 slope, Red Ash vein, now down 1,000 feet.

Baltimore Slope.—No. 3 slope in Red Ash vein extended. Now down 1,700 feet and in basin; 300 feet driven in 1899. Endless rope haulage, 900 feet long, transporting coal from head of slope to foot of shaft. Engines, 10x10 inches, located at head of shaft. Ropes carried down pump shaft. The track gauge was changed in July, 1899, from 4 feet 8½ inches to 3 feet.

Conyngham.—No. 6 plane, Abbott vein, now up 1,400 feet, still driving. No. 7 plane, Kidney vein, now up 1,020 feet, completed. No. 2 slope, in Baltimore vein, down 900 feet in basin. The air shaft at main shaft has been retimbered and relined, as has the one at Hillman shaft. One Ingersoll air compressor, 20x18x30 feet. Air pipes passes down shaft to Hillman vein, where the air is used to operate two hoisting engines, 10x12 feet, and one pump, 24x10x24 feet.

Wanamie Colliery.—Tunnel top to bottom split, Baltimore, 44 yards. Tunnel Red Ash to Ross, 85 yards.

Maxwell Colliery.—Opening Red Ash vein in deep shaft. Two tunnels from bottom to top split Red Ash vein, each 30 yards. Remodelled portion of breaker and installed jigs. Two hundred and fifty horse-power Babcock & Wilcox boilers installed.

Improvements by the Delaware and Hudson Company During the Year 1900.

Baltimore Slope—Sinking No. 5 shaft, which is the old Meadow shaft, enlarged from 9 feet 6 inches x 19 feet to 12x28 feet from surface to Baltimore vein, 385 feet. This shaft will be continued in solid, same size to Red Ash vein.

Baltimore No. 2.—No. 6 slope, in Red Ash vein, sunk 700 feet, operated by 10x12 inch engines, with air, only temporary.

Washery relieving breaker and saving small sizes. Refuse is taken down a new 10-inch bore hole 530 feet deep to Red Ash vein.

Baltimore Tunnel.—No. 6 slope, Red Ash vein, extended 800 feet, with a total depth of 1,400 feet.

No. 10 plane completed 3,300 feet, and is operated by pair of 16x36 inch engines, the rope running through bore hole 132 feet deep. New engine house, brick, 20x40 feet, for No. 10 plane engines.

Conyngham.—No. 6 plane, in Abbott vein, now up 1,450 feet.

No. 2 slope, in Baltimore vein, down 900 feet, completed.

Rope haulage operating No. 6 Abbott and No. 7 Kidney planes and delivering coal to foot of No. 1 Hillman slope. Operated by 14x30 inch engines, located on surface, ropes running through 8-inch bore hole, 477 feet deep, to Hillman vein. Haulage is 4,750 feet long.

Plymouth No. 1.—This shaft is completed to the Bennett vein. Plymouth pumping plant.

Another pump room, 22x54 feet, stone side walls and brick arch, is completed.

A compound pump steam cylinder, one 26-inch and two 38-inch, with three plungers 11x48 inches, built by the Dickson Manufacturing Co., has been set up, and will soon be in running order. This pump has a capacity of 3,000 gallons per minute.

New fan 10x28 feet, brick house 48x48 feet.

Fan driven by two engines, 16x36 inches, to ventilate Plymouth No. 2, Red Ash vein.

Plymouth No. 2.—New set hoisting engines, 26x48 inches, with half cone drums. Engine house brick, 42x38 feet.

Washery, relieving breaker and saving small sizes; refuse is taken down a new 10-inch bore hole, 600 feet long, to Bennett vein. No. 13 tunnel to top split in 200 feet; still driving.

A second opening from the Five Foot to the Stanton seam, for the purpose of ventilation.

Wanamie No. 18.—Erection of ten double blocks of houses for the use of employes.

A return airway from the Red Ash to the Ross seam at No. 19 Slope, for the purpose of ventilation.

Maxwell No. 20.—Erection of a forced fan draft system in shaft boiler house.

Erection of new engine house, and installation of one pair of 24"x48" double drum friction engines for operating No. 6 Baltimore Slope and No. 7 Red Ash Slope.

Improvement by the Lehigh Valley Coal Company During 1902.

Dorrance Colliery.—An 18 degree rock plane, 375 feet in length, for haulage, has been driven from the Baltimore to the Five Foot seam. Also, a 30 degree rock plane, 225 feet long, for a second opening.

A slope has been extended in the Hillman 300 feet from the crown of the Cemetery anticlinal into the North basin.

A battery of six return tubular boilers of 150 horse power each. The boiler house has been equipped with duplicate feed pumps and forced draught fans.

The tower over the main hoisting shaft was rebuilt.

Franklin Colliery.—No. 8 Slope in top split of Red Ash seam was extended 310 feet, and a rope bore hole, 340 feet in length, completed from the surface to the head of the slope.

The bottom lift, Red Ash gangway, has been reopened for the extension of the unfinished tunnel to the Ross seam.

The head frame and fan at Red Ash second opening have been rebuilt.

A washery is under construction for the preparation of coal from the culm banks.

Conyngham.—No. 4 tunnel, 348 feet long, driven from Abbott to Snake Island seam.

No. 5 tunnel, 108 feet long, driven from Abbott to Snake Island seam.

Three-inch drainage bore hole, 314 feet deep, from Hillman sump to Baltimore seam, to drain water to shaft sump.

Baltimore No. 5.—An entirely new colliery plant, known as Baltimore No. 5, including a 2,000-ton breaker, was built during 1901, and began operations January 1, 1902. This plant prepares the coal from Baltimore tunnel and Baltimore No. 2 workings, which latter breaker was burned on January 26, 1901. The coal is transported overland to the breaker, on a surface railroad, also built

for No. 10 tunnel return, 124 yards. Rock plane airway, Kidney to Abbot for No. 9 tunnel return, 70 yards. Rock plane airway, 3d West Hillman to No. 9 tunnel Abbot, 90 yards. Three inch drainage bore hole, No. 5 slope Hillman sump to Baltimore.

Stanton No. 7 Colliery

Outside.—Duplex air compressor, simple steam, compound air. Five hundred H. P. battery, B. & W. boilers. Colliery shop.

Inside.—Triple-expansion, condensing, duplex pump, brick arch pump room, and sump tunnel to shaft sump. No. 4 Rock slope, from surface to Abbot, 100 yards.

Jersey No. 8 Washery

Conveyor, railroad and steam shovel equipment to work Hartford No. 6 culm bank.

Sugar Notch No. 9 Colliery

Outside.—Five hundred H. P. battery, B. & W. boilers.

Inside.—Compound duplex pump and brick and structural steel pump room, located on 3rd West Ross. Rock plane airway, Red Ash to Baltimore, 100 yards. No. 15 tunnel, Baltimore to Stanton vein, 195 yards.

Maxwell No. 20 Colliery

Outside.—Five hundred H. P. battery, B. & W. boilers. Duplex air compressor, simple steam, compound air. Brick engine house for compressor and electric lighting plant.

Inside.—No. 10 tunnel, extended from Ross to Baltimore, 312 yards. No. 16 tunnel, Hillman to Hillman across basin, 37 yards. Compound condensing duplex pump, pump rock in rock, and tunnel Baltimore to Twin for sump, Baltimore shaft to level. Sanitary barn to accommodate thirty (30) mules, Red Ash shaft level.

LEHIGH VALLEY COAL COMPANY.

Dorrance Colliery

Hillman vein slope extended 654 feet into the basin north of cemetery anticlinal. Tunnel finished from Abbot to Snake Island—Middle plane level. Tunnel commenced on Upper level to same vein. Tunnel is being driven from Hillman to Five Foot vein, 232 feet. New slope started from lower Bennett gangway to reach the basin below Slant slope. New inside slope started to work river warrant—Hillman vein. Preparations are being made and work started to sink main hoist shaft from Baltimore to Red Ash, also second opening rock slope for same. A new stable is being made, and improvement to pump houses. Fire emergency water lines extended during the year. A series of test holes were put down from surface

Sugar Notch No. 9 Colliery

Outside.—Fuel conveyer breaker to boiler house.

Inside.—No. 18 tunnel Baltimore to Cooper, 57 yards; No. 13 tunnel Baltimore to Stanton, 135 yards; No. 16 tunnel Twin to Cooper, 33 yards; No. 17 tunnel Ross to Twin, 37 yards.

Maxwell No. 20 Colliery

Inside.—No. 18 tunnel Red Ash to Ross, 98 yards; No. 10 tunnel extended to Ross, 124 yards; tunnel airway for No. 7 slope, 67 yards; No. 7 tunnel Red Ash to Red Ash, 39 yards; rock plane airway Red Ash to Ross for No. 18 tunnel, 51 yards.

SUSQUEHANNA COAL COMPANY

Colliery No. 5

Outside.—Two new bridges built across Forge Creek for transportation from shafts Nos. 4 and 5, also from No. 14 slope and No. 4 and 4½ drifts. A new Ingersoll duplex compound air compressor placed to further increase the amount of air for hoisting and pumping from No. 2 shafts and No. 4 slope.

Inside.—New tunnel No. 4½ from surface towards Ross seam above drainage level. New slope sunk in Twin Seam inside tunnel No. 8 in No. 2 shaft.

Colliery No. 6

Outside.—A new jig house was commenced for the better preparation of coal at this breaker.

Inside.—An air shaft was sunk to the bottom split Ross seam No. 6 slope; a new shaft 13x16 feet 6 inches was sunk to a depth of 402 feet to the bottom split Ross vein, also head frame, hoisting engines and foundation, compressor, boilers and boiler house, steam line and tracks on surface for same shafts.

Colliery No. 7

Outside.—New jig house as previously mentioned completed and now in operation, also boiler house to contain 4,000 H. P. Babcock and Wilcox boilers has been begun and will be completed during the present year.

Inside.—No. 13 tunnel extension to Hillman seam in No. 1 North shaft; a 12 inch bore hole a depth of 979 feet was driven from the surface to the Lee vein for steam line to furnish steam for pumping from the various levels in No. 1 shaft. There were also purchased during the year at No. 5 colliery, 200 steel mine cars.

South Wilkes-Barre No. 5 Colliery

Outside—Two pairs 24x48 hoisting engines Nos. 6 and 7 slope; brick oil house.

Inside—No. 13 Tunnel Baltimore to Five Foot; No. 14 Tunnel Baltimore to Five Foot; No. 15 Tunnel Five Foot to Stanton.

Stanton No. 7 Colliery

Inside.—Compound condensing duplex pump and reinforced concrete pump room.

Sugar Notch No. 9 Colliery

Outside.—Supply store; started erection new breaker.

Inside.—No. 19 Tunnel Twin to Twin; No. 15 Tunnel extended Stanton to Hillman.

Maxwell No. 20 Colliery

No. 19 Tunnel Hillman to Kidney; No. 20 Tunnel Red Ash to Twin; Rock plane airway Hillman to Kidney; Bore hole for culm slushing.

LEHIGH VALLEY COAL COMPANY

Dorrance Colliery

Baltimore shaft extended 170 feet and landings are being turned off from which tunnels will be driven to the Red Ash vein.

No. 13 Rock slope has been finished to the Red Ash vein. This to be used for a second outlet.

No. 6 Rock slope has been finished and a tunnel is being driven through Mill Creek Anticlinal to the main South dip.

No. 14 sub-slope in the Cooper and No. 15 sub-slope in the Bennett vein have been extended 800 feet.

Two tunnels are being driven in the Five Foot plane level to the Hillman vein.

No. 13 Tunnel from the Hillman to the Abbott finished.

No. 10 slope in the Bowkley has been finished to the basin.

Two tunnels, each 125 feet long, were driven from Bennett to Cooper vein in bottom lift of extension slope.

No. 1 Tunnel Hillman to Bowkley has been finished to the Abbott vein.

A new concrete wash-house equipped with 100 lockers has been erected.

One thousand five hundred H. P. Stirling water tube boilers has been installed, dispensing with 1,200 H. P. tubular.

The boiler house has been rebuilt with brick and corrugated iron roof.

The outside barn has been rebuilt, also mule hospital and concrete fire hose house.

Franklin Colliery

Three hundred H. P. Stirling water tube boilers are being erected.

The water has been pumped out of the fire water submerged district in long slope and the Sump vein No. 7 slope has been extended to the No. 2 old level.

IMPROVEMENTS

LEHIGH AND WILKES-BARRE COAL COMPANY

Hollenback No. 2.—Outside: Brick locomotive house, new engines, Hillman slope.

Inside: Number 20 Tunnel Hillman to Stanton, No. 21 Tunnel Hillman to Stanton, No. 22 Tunnel Kidney to Stanton, No. 23 Tunnel Hillman to Stanton. Compressed air haulage plant.

South Wilkes-Barre No. 5.—Inside: No. 16 Tunnel Hillman to Kidney, No. 17 Tunnel Kidney to Hillman. Compressed air haulage plant.

Stanton No. 7.—Outside: 488 H. P. water tube boilers, steel head frame Empire No. 4 shaft, extension railroad to Empire shaft, brick engine house Empire shaft, brick locomotive house, brick oil house.

Inside: Compressed air locomotive. No. 11 Tunnel Red Ash to Ross.

Maxwell No. 20.—Outside: Supply house.

Inside: No. 7 Rock slope. Compressed air haulage plant.

No. 21 Tunnel Red Ash to Red Ash. Tunnel Hillman to Hillman.

LEHIGH VALLEY COAL COMPANY

Henry Colliery.—A series of safe cover test holes was drilled to determine the working limits in the 5 foot Hillman and Bowkley Veins.

A permanent concrete steel overcast was completed in Red Ash Vein.

New empty car plane and turnout were completed in Red Ash Shaft.

Numbers 21, 23, 27 and 28 sub-slopes have been started in Red Ash Shaft and are being extended.

A new 28x10x36 inch Goyne pump with 12 inch column and 8 inch exhaust pipe from the foot of shaft to the surface has been installed in the Red Ash Vein.

Numbers 51, 53, 54 and 56 tunnels have been finished through the Red Ash anticlinal.

A new permanent concrete steel overcast was completed in Wyoming Marcy Vein.

Preparations have been made and plans outlined and work commenced unwatering the Enterprise workings lying to the east of Henry.

Additional pumps have been placed in the 5 foot vein at the counter level of the Henry Shaft and a series of Diamond drill holes put through the pillar. These holes are being reamed out, so that it is expected by the close of the coming year the Enterprise workings will be unwatered and the coal in that property reclaimed.

Additional steam lines and column pipe lines and emergency pumps incidental to this work have been set in place. The new permanent plant to follow.

The Henry Washery has reclaimed all of the old Wyoming banks on the north side of the L. V. R. R. and the shovel and locomotive outfit has been transferred to the Enterprise banks to reclaim the coal through the Henry Washery.

A new bridge was constructed across the C. R. R. of N. J. and public road for the culm dump.

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

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

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

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

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

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

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

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

Vein connection made through Mill Creek anticlinal from No. 18 Tunnel Upper Baltimore to Plank road, Upper Baltimore workings.

2-10 ton electric locomotives installed in Hillman vein.

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

Extension was made to new Hillman vein stable.

Outside

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

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

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

LEHIGH AND WILKES-BARRE COAL COMPANY

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

No. 19 Tunnel extended to Ross.

Rock Plane airway Stanton to Hillman.

No. 5 Slope graded through rock.

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

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

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

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

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

South Wilkes-Barre No. 5 Colliery

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

Stanton No. 7 Colliery

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

Sugar Notch No. 9 Colliery

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

Maxwell No. 20 Colliery

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

LEHIGH VALLEY COAL COMPANY

Prospect Colliery

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

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

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

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

RED ASH COAL COMPANY

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

PITTSTON COAL MINING COMPANY

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

WILKES-BARRE ANTHRACITE COAL COMPANY

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

IMPROVEMENTS

LEHIGH AND WILKES-BARRE COAL COMPANY

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

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

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

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

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

LEHIGH VALLEY COAL COMPANY

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

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

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

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

LEHIGH + WILKES-BARRE COAL CO

Maxwell No. 20 Colliery:

Outside.—Wash house.

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

LEHIGH VALLEY COAL COMPANY

Prospect Colliery:

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

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

Henry:

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

CONDITION OF COLLIERIES

LEHIGH AND WILKES-BARRE COAL COMPANY

Stanton No. 7, Maxwell No. 20, South Wilkes-Barre No. 5, Hollenback No. 2, Sugar Notch No. 9 Collieries.—Ventilation, roads, drainage and condition as to safety, good.

LEHIGH VALLEY COAL COMPANY

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

Franklin Colliery.—Ventilation and condition as to safety, good. Roads and drainage fair.

DELAWARE AND HUDSON COMPANY

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

RED ASH COAL COMPANY

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

WILKES-BARRE ANTHRACITE COAL COMPANY

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

RISSINGER BROTHERS AND COMPANY, INCORPORATED

Miners Mills Colliery.—Ventilation, roads, and drainage fair. Condition as to safety, good.

PITTSTON COAL MINING COMPANY

Hadleigh Colliery.—Ventilation, roads and drainage fair. Condition as to safety, good.

IMPROVEMENTS

LEHIGH AND WILKES-BARRE COAL COMPANY

Stanton No. 7 Colliery.—Completed fireproof mule barn on Empire No. 4 shaft level and tunnel Abbott to Abbott, 2nd east, No. 4 slope. Installed concrete and steel timbering on shaft landing, also in small engine and pump rooms.

Outside.—Completed new steam line from Empire boiler plant to No. 4 slope and No. 15 Plane engines, timber yard and saw mill installed; safety car stops at Nos. 4 and 7 shafts and fire protection system in breaker.

Maxwell No. 20 Colliery.—Inside: Completed fireproof mule barn and concrete manway from surface to Five Foot.

CONDITION OF COLLIERIES

LEHIGH AND WILKES-BARRE COAL COMPANY

Stanton No. 7, Maxwell No. 20, South Wilkes-Barre No. 5, Hollenback No. 2 and Sugar Notch No. 9 Collieries.—Ventilation, roads, drainage and condition as to safety good.

LEHIGH VALLEY COAL COMPANY

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

DELAWARE AND HUDSON COMPANY

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

WILKES-BARRE ANTHRACITE COAL COMPANY

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

RED ASH COAL COMPANY

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

RISSINGER BROTHERS AND COMPANY, INCORPORATED

Miners Mills Colliery.—Ventilation, roads and drainage fair; condition as to safety good.

PITTSTON COAL MINING COMPANY

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

IMPROVEMENTS

LEHIGH AND WILKES-BARRE COAL COMPANY

Stanton No. 7 Colliery.—Inside: Completed No. 31 tunnel, bottom to top, Red Ash; No. 18 tunnel, Hillman to Kidney; No. 19 tunnel, Baltimore to Five Foot. Rock plane airway, top Red Ash to Ross; No. 11 tunnel, West Empire; tunnel top to bottom Red Ash, No. 2 tunnel west.

Outside: Installed slush pump.

Maxwell No. 20 Colliery.—Completed No. 6 plane, bottom to top Red Ash; tunnel top to bottom Red Ash, No. 4 tunnel east; No. 29 tunnel Hillman to Kidney; two tunnels bottom to top Red Ash, No. 20 tunnel east. Installed 10 by 36-inch compound pump on 4th lift, No. 4 slope.

South Wilkes-Barre No. 5 Colliery.—Completed No. 29 tunnel, top to bottom Baltimore; Rock slope, Hillman to Hillman, No. 3 slope; tunnel, Stanton to Stanton, First East No. 12 plane.

Outside: Installed feed water heating system.

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

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

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

LEHIGH VALLEY COAL COMPANY

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

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

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

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

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

CONDITION OF COLLIERIES

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

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

Avondale Colliery.—Ventilation, fair. Drainage, roads and condition as to safety, good.

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

LEHIGH AND WILKES-BARRE COAL COMPANY

Sugar Notch No. 9 Colliery.—Ventilation and condition as to safety, good. Roads, fair.

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

Buttonwood No. 22 Colliery.—Ventilation, drainage, roads and condition as to safety, good.

LEHIGH VALLEY COAL COMPANY

Franklin Colliery.—Ventilation and condition as to safety, good. Drainage and roads, fair.

Warrior Run Colliery.—In No. 1 Slope section, ventilation, drainage, and condition as to safety, good. Condition of roads, fair. In No. 4 Slope section, ventilation, roads and condition as to safety, good. Drainage, bad.

GEORGE F. LEE COAL COMPANY

Chauncey Colliery.—Ventilation and condition as to safety, good. Drainage and roads, fair.

PITTSTON COAL MINING COMPANY

Hadleigh Colliery.—Ventilation and drainage, fair. Roads and condition as to safety, good.

WEST NANTICOKE COAL COMPANY

West Nanticoke Colliery.—Ventilation, drainage, roads and condition as to safety, good.

IMPROVEMENTS

LEHIGH AND WILKES-BARRE COAL COMPANY

Maxwell No. 20 Colliery.—Completed No. 33 tunnel from No. 6 plane Top Red Ash to Bottom Red Ash vein, also extension of No. 12 slope, Baltimore vein, from 2nd and 3rd levels. No. 13 slope, Top Ross vein was driven to the basin, No. 6 plane. Hoist is being installed on the surface to take care of coal on No. 6 plane. No. 10 slope, Hillman vein, is being extended from basin.

Baltimore vein in No. 6 slope; rock gangway in fault on No. 1 east lift, west of No. 12 tunnel from Red Ash to Red Ash vein No. 2 slope; extension of No. 33 tunnel, 7 by 12 by 100 feet from Red Ash to Bottom Red Ash vein, No. 3 slope, No. 1 shaft, and No. 21 slope, 7 by 14 by 216 feet, making a total distance of 350 feet from the surface to the Forge vein in the Sugar Notch section.

Installed two 10 ton electric locomotives and nine 7 ton with reel devices; one 1,000 gallon bronze centrifugal pump 400 feet head, 150 H. P., 440 volts, 1160 R. P. M.; in No. 4 west lift, No. 1 slope, Mills vein, one 2 speed electric hoist 1,000 pounds rope strain, 42 H. P., speed 250 feet in No. 16 slope; one 1,800 gallon centrifugal pump and motor complete to pump water from reservoir to annex; two stage turbine, size 10, No. 571191-W, 125 H. P.; electric hoist, rope speed 250 feet per minute, 500 pounds rope strain, 50 H. P. motor on No. 15 slope, Mills vein; new electric signals, cables, etc., in No. 2 shaft.

Erected two new houses for the mine foremen; 31 steel towers to support high tension transmission lines between Nanticoke power plant and No. 20 tunnel, Sugar Notch. Equipped the east end of store room building for emergency hospital purposes and doctor's office to take care of injured employes.

Installed automatic telephone exchange and 32 telephones, connecting the Superintendent's office with all important surface buildings and important parts of the mines. This apparatus was built by the Chicago Automatic Telephone Company.

Continued the erection of new steel breaker which is replacing the original wooden structure. This breaker when completed and equipped with machinery, jigs, etc., will be one of the most modern in the anthracite coal fields, being entirely constructed of structural steel and glass which will allow about 96 per cent. daylight space throughout the entire building.

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Maxwell No. 20 Colliery.—Completed No. 32 tunnel, Ross to Top Red Ash veins. Retimbered hoisting shaft at Hillman vein.

Outside: Installed two 24 inch by 36 inch hoisting engines, and erected house for same at No. 5 slope.

Sugar Notch No. 9 Colliery.—Completed No. 35 tunnel, Five Foot to Stanton vein; and No. 36 tunnel, Stanton to Hillman vein.

Buttonwood No. 22 Colliery.—Completed tunnel, Hillman to Red Ash shaft, Inman section; No. 9 rock plane, Stanton to Kidney veins; No. 16 tunnel, Abbott to Abbott veins and No. 17 tunnel, Stanton to Hillman veins; rock plane airway, No. 3 to No. 4 vein; No. 18 tunnel, No. 3 to No. 6 vein; extension of No. 14 slope through fault; rock plane airway, Hillman to Kidney, and rock plane airway, Baltimore to Five Foot. Completed the concrete and steel timbering at Hillman shaft level in Inman section.

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Warrior Run Colliery.—Installed a 16 inch by 8 inch by 18 inch Duplex Jeanesville pump on No. 2 slope.

Franklin Colliery.—The following 8 feet by 12 feet tunnels were completed: No. 35 tunnel, in rock slope workings, from the old Skid-

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

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

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

Empire Washery.—Installed pea and chestnut spirals.

LEHIGH VALLEY COAL COMPANY

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

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

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

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

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