The Parrish Coal Company.

This company began to operate the Parrish colliery, and started the breaker in the latter part of December, 1884. The breaker is a model of neatness, and everything in the structure is well arranged for producing its intended work. There are two forty-horse-power engines, one to hoist the coal over the inclined plane up to the breaker, and the other to run the breaker machinery. Both are supplied with steam from two new boilers located close to the structure. They are mining the Baltimore and Ross seams, have four horizontal openings or drifts, one of which is on a level with the bottom of the breaker-plane, and the coal from the others is lowered over gravity planes. It is a new colliery operated by a company organized in 1884.

Destruction of Coal Breakers by Fire.

The old Hartford, or No. 6, breaker of the Lehigh and Wilkes-Barre Coal Company, at Ashley, took fire in some mysterious manner about eight o'clock, P. M., January 22, 1884, and was burned to the ground. It was the oldest structure of this kind in this valley, and was still capable of passing a large quantity of coal.

The Forty-Fort breaker of the Wyoming Valley Coal Company took fire early in the morning of November 27, and was totally destroyed. It is not known how it took fire, and this will very probably remain a mystery. The coal is now taken to the Harry E. breaker and shipped from there.

a tunnel from the Hillman toward the Kidney vein, which at the close of the year was driven a distance of 250 feet. Its size is 12×7.

The Hanover Coal Company.

At the Maffit colliery of this company a tunnel was driven from the Ross to the bottom split of the Baltimore seam. Its sectional area is 7×12 feet and its length 200 feet. A second opening was effected, and the new seam is now being mined. A tunnel is in progress also from the Ross to the Red Ash seam, which will open a long lift of that vein.

The Parrish Coal Company.

A twenty-foot fan was erected at this colliery, which improved the ventilation to a great extent. Running 32 revolutions, it produces a ventilation of 75,000 cubic feet of air per minute. They are sinking a slope at this mine also to work the Baltimore seam.

Fire in the Dorrance Colliery.

This colliery belongs to the Lehigh Valley Coal Company and is located in the northern end of Wilkes-Barre. Late on Saturday evening, June 13, 1885, while the night shift were at work sinking the underground slope, the gas-blowers ignited from a miner's lamp. It very soon spread, and set the brattice and timber on fire, to such an extent that in spite of the most strenuous efforts they failed to extinguish it by the ordinary means and it was concluded to flood the mine with water. Water was pumped in from the river. While it was filling, a considerable quantity of smoke was ascending both shafts. By July 2, the mine had filled with water to a point sixty feet vertically higher than where the fire existed, and, believing it was extinguished, they began to hoist the water out. By July 12, the water was lowered to within two feet of the bottom of the gangway, when, to every one's surprise, four explosions took place, showing that fire still existed. The water was poured in again until the air-passages on the east side, where the fire existed, were closed. Then an examination revealed the fact that fire existed in the air-way at a point where it was much higher than the surrounding entrances, and they at once went to work to lay pipe from this high point out so that the air and gases could escape while the water was filling. This was a very dangerous work, because it had to be done in very noxious gases, consequently it was slow and tedious. By August 1, this was completed and water was poured in again. The air escaped all right for a day or two, but the heat caused steam to rise, saturating the air, and this again condensing in the pipe, soon filled the lowest point with water and made it useless. After leaving the water stand awhile, it was pumped out until it lowered so that the east air-way could be entered, and an examination proved that the fire was extinguished. After pumping the water all out, it was seen that the fire had spread over considerable ground and had done material damage, but this in time was re-

reported to exhaust 30,000 cubic feet of air per minute while running thirty revolutions.

Parrish Coal Company.—This company erected a new fan on their slope. It is twenty feet diameter, running forty-five revolutions per minute and exhausting 68,000 cubic feet of air per minute.

A. J. Davis.—At the Warrior Run colliery a new air-shaft was sunk, effecting a second opening to the new tunnel. It is 9x9 feet and 206 feet deep, and connects with the Baltimore seam. The main slope is being extended also to a further depth of from two to three hundred feet.

Hanover Coal Company.—The Maffet shaft of this company is being extended from the Ross to the Red Ash seam. It was down a distance of 185 feet below the Ross at the close of the year, and when completed it will open an extensive lift of good coal. A number of other improvements were made during the year.

Coal Breakers Consumed by Fire.

On Sunday, January 16, 1887, between one and two o'clock A. M., the Boston breaker of the Delaware and Hudson Canal Company, at the upper end of Plymouth, took fire and was totally consumed. It is not known how it originated, but everything in and about the breaker was destroyed. By November 3rd, a new breaker was erected near the Boston shaft, about a mile and a quarter north-east of the site of the old one. This is a great improvement on the old one. They began to pass coal through it on the date mentioned. They worked eight and one-fourth days before the old breaker took fire and forty-one and three-fourths days with the new one before the close of the year.

Burning of the Parrish Coal Company Breaker.

At about ten o'clock P. M., January 25, 1887, the breaker of the Parrish Coal Company, at Plymouth, was discovered to be on fire, and although strenuous efforts were made to prevent its destruction, it was completely destroyed in a short time. It was comparatively a new breaker, having been in operation only since December, 1884, about a month more than three years. Preparations were immediately made to erect a new one, and on July 7 it was completed and started to prepare coal for shipment to market. The new one is a fine structure, larger than the old one, and has the best appliances for preparing and separating coal.

Burning of the No. 10 Breaker.

The No. 10 breaker of the Lehigh and Wilkes-Barre Coal Company, at Sugar Notch, took fire from a passing locomotive early Monday morning, May 2, 1887, and it, with every building within a radius of two hundred feet was completely destroyed. The engine-house and slope head house on the old No. 10 slope was burned, and the cage

Newport Coal Company.

The Newport colliery, formerly called East End, is being prepared to resume work by this company, and is expected to be ready to ship coal at the beginning of the year 1889.

Parrish Coal Company.

A new slope was opened by this company on the Ross vein, and was sunk to a length of 1500 feet. This opens an extensive area of coal, which is convenient for shipment and is of excellent quality.

Observations on the Furnace and Fan Mine Ventilation.

The ventilation of the Third Anthracite District is produced entirely by fans, which are frequently called centrifugal ventilators. In times past the furnace was extensively employed for this purpose, but in all shallow mines this proved itself to be a fickle, unreliable and inefficient producer of air-currents, and it was gradually superseded by the fan as the superiority of that machine became known.

With the knowledge now extant regarding the laws of mine-ventilation, it is astonishing that the ventilation of a shallow mine should be attempted by a furnace. It has been demonstrated in many instances that where the depth of the upcast column of air is less than from eight to nine-hundred feet, the fan is more effective, more reliable, and in many ways safer for the purpose of producing ventilation.

It is well-known that motion in air, or air-currents, are produced by a difference in pressure, and the direction of the current is, invariably, from the air under the highest pressure, towards the air under the lowest pressure. It makes no difference by what means a difference of pressure is produced, whether by a furnace, by a fan or by a piston-machine, the samedifference of pressure produces the same quantity of air-current. It is obvious, therefore, that the most effective ventilator is the one which produces the greatest difference of pressure. This difference of pressure may be measured by any of the various instruments which indicate small pressures, such as a barometer, water gauge or a pressure meter, and it is frequently designated as so many inches of "water gauge," "drag," "depression," or "ventilating pressure." Whichever term is used, it is understood to be expressing the length of a column of water equal in weight to the pressure exerted in producing the ventilation, and a pressure which sustains a column of one inch of water is equal to a power of five and two-tenths pounds per square foot, acting on the intake air-way as a propeller of the air-current.

In a mine where the air is of equal temperature, and also of equal pressure, there cannot be a current, but if there are two openings to the mine, and if the equillibrium is broken by a decrease or increase of pressure in one of the openings, a current will rise and move from the point of greater towards the lesser pressure.

Air, on being heated, expands and becomes lighter, volume for

At the No. 6 shaft, Glen Lyon, another opening was effected by driving to connect with the No. 6 tunnel, and a part of this is utilized as a gravity plane, which has a grade of 30°. This was driven through disturbed faulty strata from the Ross seam and connects to the side of No. 6 tunnel.

Improvements by the Delaware, Lackawanna and Western Railroad Company.

At the Avondale colliery the new underground slope on the Red Ash seam is being sunk. It extended below the lower level gangway a distance of 750′ on an average grade of 12°.

At the Woodward colliery a new slope was sunk on the Red Ash seam, from the east level gangway, a distance of 700′ on a grade of about 5°. A tunnel was driven from the same seam, west of the shaft, to the Ross seam a distance of 500′ and having an area of 7′×14′. Important improvements were also made in the ventilation of this colliery by erecting new air bridges of substantial brick work. This colliery is opened in excellent shape, and the officials spare no pains in having everything arranged in the best order.

Improvements by the Lehigh Valley Coal Company.

At the Franklin colliery a new air shaft, 8′×10′, was sunk near the outcrop of the Abbott seam and connecting with the workings of that seam. This effected a very desirable improvement in the ventilation of the thin upper seams of this mine.

Improvements by the Alden Coal Company.

The main shaft of this company was extended from the Twin to the Red Ash seam and has now a total depth of 586′. An underground slope has also been sunk in the Red Ash seam to a length of 1,741′ on a grade of 14°, the average dip of the seam. This work is chiefly in the Ross and Red Ash seams.

Improvements by the Plymouth Coal Company.

At the Dodson colliery a new slope was sunk through the rock across the strata from the Bennett to the Ross seam. Its area is 7′×15′ and its length 382′ on a grade of 21°. A second opening is now being driven and will be completed in a few weeks. The hoisting engine is located underground near the head of the slope and the engines are worked by compressed air taken down from compressors on surface.

Improvements by the Parrish Coal Company.

The Baltimore seam slope of this company was extended a distance of 700′ and opened a productive extent of excellent coal. They leased also the old Buttonwood shaft property and are at work enlarging the old shaft and making preparations to reopen the mine on a large scale.

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,

the year. The hoisting engines for both these slopes are located on the surface, the ropes passing down through bore holes.

At the Boston colliery, several hundred feet east of the old shaft, a new shaft has been started. It is intended to sink it from the surface to the red ash seam. Its size is 12x33½ feet and it was sunk to a depth of 110 feet by the end of the year 1893.

The sinking of another shaft is in progress by this company about a quarter of a mile east of the No. 5 shaft. It was sunk at the close of the year to a depth of 115 feet. Its size is 10½x33½ feet.

Improvements by the Susquehanna Coal Company.

At the No. 1 shaft a slope was made through old workings a length of 1,400 feet on a dip of 8½ degrees; size 8x16 feet.

Another slope is being sunk in the George seam. Its size is 8x16 feet and it was at a length of 1,000 on an average dip of 8½ degrees at the end of the year.

A new tunnel was driven from the Forge to the Mills seam a length of 800 feet, and a size of 8x14 feet.

At the No. 4 slope, a tunnel 300 feet long was driven from the Mills seam and a rock plane was driven from the Mills to the George seam. Its length is 300 feet; grade, 20 degrees, and size, 8x14 feet.

Improvements by the Delaware, Lackawanna and Western Railroad Company.

At the Avondale colliery a horizontal tunnel was driven through the rock from the red ash to the Ross seam. Its size is 7x10 feet and its length 300 feet. This opens a large area of the Ross seam.

At the Woodward colliery both underground slopes were extended, the one in the red ash seam a length of 306 feet to a total length of 2,019 feet and the slope on the Baltimore seam was extended a length of 372 feet, thus opening in each a new lift. The tunnel mentioned in last year's report, which is being driven from the red ash to cut the Baltimore seam was driven a distance of 486 feet. Its total length now is 1,686 feet. When this tunnel is completed it is intended to haul the coal of the Baltimore seam below a certain line in the slope out through it to the foot of the red ash shaft, where it will be hoisted to the surface.

The three new shafts in progress of sinking by this company in Hanover township are not yet completed. The Bliss shaft was at a depth of 669 feet. The Auchincloss No. 1 at a depth of 661 feet, and the Auchincloss No. 2 at a depth of 659 feet. The size of each shaft is 12x43 feet 3 inches.

Improvements by the Parrish Coal Company.

At the Parrish colliery a new air shaft was sunk to a depth of 60 feet, having a sectional area of 216 square feet. For the purpose of

improving the ventilation a 24-foot Guibal fan was erected, run by a horizontal engine, 20x36-inch. Under a speed of 50 revolutions and one inch water gauge, it is exhausting 120,000 cubic feet of air per minute. The upcast has an area of 136 feet and the downcast an area of 100 square feet.

The Buttonwood shaft, which is an opening for a new colliery, was sunk to a depth of 680 feet, having cut four coal seams. The air shaft connected therewith is at a depth of 400 feet, having a sectional area of 12x22 feet.

The new breaker is in course of construction and will be ready to ship coal to market some time in 1894.

Improvements by the Newport Coal Company.

At the Lee colliery a new shaft was sunk to work the basin south of the breaker. Its size is 12x15 feet and depth at present 200 feet, and it has cut the Hillman and the upper split of the Baltimore seam. A second opening is effected by connecting to the slope.

PUMPING BY ELECTRICITY.

The first electric pump in this district was introduced into the Woodward colliery of the Delaware, Lackawanna and Western Railroad Company, to be used instead of the steam pump in the red ash seam slope underground. The heat radiating from the steam pipe was detrimental to the ventilation, and in order to dispense with it, the electric pump was introduced on trial and it has proven very satisfactory. The power station is located in the hoisting engine house on surface. The generator is a No. 25 Thomson-Houston machine of 500 volts, driven by a Ball & Wood automatic engine. From the power station two No. 0 B. & S. wires run overground to the air and drop down the shaft to the red ash seam. They simply hang down the shaft from the hangers at the top. From the shaft bottom to the bottom of the slope they are conducted down the return airway, one on each side. The pump is a horizontal triplex, single acting, with bronze outside packed plungers, 6½x8 inches. It is mounted on a truck which constitutes its frame and is furnished with wheels so that it may be quickly moved. It is operated by a 20-horse power motor, the frame of which makes a casing to protect the motor in case of falls or droppings of water. The motor actuates the pump through double reduction cut spin-gears; the high speed pair is running in a gear case filled with oil. On the left of the motor is the rheostat for starting and stopping the machinery. At this point sparks are emitted which would make it unsafe to run in case a squeeze should take place releasing an extra volume of explosive gases. This makes it necessary to keep the steam pump in place ready for emergencies of this character.

CLASSIFICATION OF FATAL AND NON-FATAL ACCIDENTS.

Causes of Accidents.	Killed or fatally injured.	Severely injured.
By explosions of fire-damp,	7	33
By falls of roof and coal,	44	68
By falling down shafts,	2	. . .
Crushed and run over by mine-cars,	7	59
By explosions of powder and blasts,	4	23
By miscellaneous causes underground,	6	27
By miscellaneous causes on surface,	7	23
Totals,	77	233

Number of widows, 46; orphans, 182.

The Collieries of the Fourth District.

During the year 1894 there were forty-three breakers and sixty-six openings at work more or less time, mining and preparing coal for market in the Fourth Anthracite district. An average of 46,789 tons per day worked was produced, making a total production of 7,162,961 tons in an average work of 153.1 days.

The collieries in operation less than 153.1 days were those of the Lehigh and Wilkes-Barre Coal Company. The No. 3 colliery of the Delaware and Hudson Canal Company, which, after working 153 days, was destroyed by fire on the evening of November 15, and remained idle the remainder of the year. The No. 3 colliery of the Susquehanna Coal Company, where the production is not sufficient to keep the breaker working all day owing to the partial exhaustion of the mine. The Gaylord colliery of the Kingston Coal Company, several weeks' idleness caused by the disastrous cave of February 13th. The collieries of the Lehigh Valley Coal Company, the Red Ash Coal Company, the Parrish Coal Company, the Maffet colliery of the Hanover Coal Company, and the Warrior Run colliery of Mr. A. J. Davis.

The Lee colliery of the Newport Coal Company did not work more than 100 days. It was suspended on August 25th, and since then has passed into the possession of another company. The Buttonwood colliery of the Parrish Coal Company is an old mine enlarged and reopened. It was lying idle since 1866. The shaft was enlarged and sunk to a deeper seam and a new breaker was erected. It began shipping coal in September, 1894, and worked 50 days until the end of the year.

William H. Sayre, second vice president, South Bethlehem, Pa.
John R. Fanshawe, secretary, Philadelphia.
John B. Garrett, treasurer, Philadelphia.
Israel W. Morris, general land agent, Philadelphia.
W. A. Lathrop, general superintendent, Wilkes-Barre, Pa.
Directors, Robert H. Sayre, George H. Myers, Joseph Wharton, Thomas McKean, Beauvèau Borie, John B. Garrett, Wm. L. Conyngham, James I. Blakslee, C. O. Skeer, Charles Hartshorne, W. A. Ingham, John R. Fell.

Collieries of the Miscellaneous Coal Companies.

Beside the collieries commented on in the foregoing articles, there were twelve collieries operated by smaller companies in the Fourth district. These together produced 1,296,722 tons of coal and shipped to market 1,192,806 tons, in an average of 129.76 days of work. They employed 3,890 persons and mined 185,246 tons of coal per life lost. Three of the seven fatal accidents took place in the Hillman vein colliery, two in the West End, and one each in the Alden and Dodson collieries. The Nos. 1 and 2 collieries of the Red Ash Coal Company, the Parrish and Buttonwood, of the Parrish Coal Company, and the Maffet, Warrior Run, Lee and Chauncey, did not have one fatal accident.

These mines are all in safe condition and efficiently ventilated. More or less firedamp is emitted in each, but not in such quantities as we find in the deeper mines. They are working closer to the outcrops where the roof is generally better than in the deeper portions of the basin.

The names of the collieries and of the officers are as follows:

Nos. 1 and 2 Red Ash Coal Company.

M. B. Williams, general superintendent, Wilkes-Barre, Pa.
P. H. Ganahan, assistant general superintendent, Wilkes-Barre, Pa.
Daniel J. James, mine foreman No. 1 Red Ash.
Joseph Hopie, outside foreman No. 1 Red Ash.
Timothy Theopilus, mine foreman No. 2 Red Ash.
John Herriotts, outside foreman No. 2 Red Ash.

Officers of the Parrish Coal Company.

H. H. Ashley, general superintendent, Plymouth, Pa.
Thomas R. Evans, general mine foreman, Plymouth, Pa.
Parrish colliery, Henry G. Wililams, inside foreman, Plymouth, Pa.
Parrish colliery, Thaddeus Eddy, outside foreman, Plymouth, Pa.
Buttonwood colliery, Wm. T. Pritchard, inside foreman.
Buttonwood colliery, Merrit Frederick, outside foreman.

Delaware and Hudson Canal Company.

No. 2 Baltimore—

A new double fan was erected, 17½ feet diameter, enclosed in brickwork, and an underground slope was driven to a depth of 700 feet, which is still being extended.

Boston—

The new shaft was sunk to a depth of 475 feet, and its sinking is continued. It is 12x33.5 feet, and has passed through three coal seams.

No. 5 Colliery—

The new shaft was sunk to a depth of 725 feet during 1894, and its sinking was continued. Its size is 10½x33 feet.

Susquehanna Coal Company.

Five new tunnels were driven in the mines of this company:

One 8x14 feet and 800 feet in length from the Ross to the Twin seam.

One 8x14 feet and 400 feet in length from the Hillman to the Hillman seam.

One 8x12 feet and 200 feet in length from the Forge to the Forge seam.

One 8x14 feet and 800 feet in length, from the Forge and was unfinished at end of year.

One 8x14 feet and 500 feet in length, from the Mills to the Mills seam.

Three of the underground slopes were extended. The No. 10 slope was extended a length of 2,000 feet. No. 12 was extended 500 feet, and No. 13 1,500 feet.

Five new gravity planes were made, varying in length from 200 to 1,500 feet. These improvements open new areas of coal property in each of the seams.

Improvements by the Parrish Coal Company.

The underground slope on the Baltimore seam in the Parrish colliery was extended a distance of 900 feet, making the total length of this slope 2,316 feet.

Improvements by the Alden Coal Company.

A new air shaft was sunk for the Alden colliery from the surface to the Cooper seam, a depth of 612 feet. Its sectional area is 416 square feet. A new fan, 24 feet diameter, is in progress of construction. The engine is 20x36 inches, directly connected. This will be applied to ventilate the north basin workings of the property.

Improvements by the Susquehanna Coal Company.

This company drove a tunnel from the George to the same seam which is 700 feet long.

Two tunnels were also driven which are not yet completed. One from the Mills to the Mills seam 8x14 feet area which is now 300 feet long. The other tunnel is from the Hillman to the Hillman, through an anticlinal, having an area of 8x14 feet and is also 300 feet long.

The Kingston Coal Company.

In the No. 1 colliery an air shaft has been sunk from the Cooper to what is thought to be the Bennett seam and a short tunnel has also been driven from the Checker to the Bennett seam. The size of the shaft is 8x10 feet; depth, 125 feet; size of tunnel, 7½x12 feet and 250 feet in length.

Lehigh Valley Coal Company.

At the Dorrance colliery a new slope has been driven from the Hillman seam through the rock on a grade of 7 degrees to the Baltimore seam and following that seam on the north rib of the anticlinal. Its length is 1,300 feet and size 8x12 feet.

At the Franklin colliery a slope has been sunk from the outcrop on the next small seam above the Baltimore. It is 1,000 feet long and will work the upper lifts of said seam. A new fan has been also erected at this colliery to ventilate the upper seams. It is fifteen feet in diameter and operated by a vertical engine. It is the first machine put up in this district to act as a forcing fan. The conditions here are favorable for that, but in gaseous mines where the haulage roads would be the return airways such a method is not practicable.

The Parrish Coal Company.

The inside slope in this mine has been extended to a length of 3,814 feet. It was 3,216 feet before.

At the Buttonwood colliery two tunnels have been driven, one for coal haulage from the Hillman to the Kidney 335 feet long, and one for ventilation and "second opening" from the old Bennett to the Hillman seam. This is 62 feet long and has an area of 70 feet.

New Breaker at Warrior Run Colliery.

The old breaker having worn beyond the power of repair has been replaced by a new one having a capacity of about 1,000 tons per day. The machinery and stairs are boxed and fenced in a satisfactory manner. The old one was abandoned at the beginning of

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance Colliery

Outside.—Duplex air compressor, simple steam, compound air; forced fan draft system for boilers, and addition to new boiler house.

Inside.—No. 18 tunnel, Red Ash to top Red Ash, 15 yards. No. 19 tunnel, Red Ash to top Red Ash, 15 yards. No. 20 tunnel, Red Ash to top Red Ash, 15 yards. No. 21 tunnel, Cooper to Five Foot, 50 yards.

Nottingham Colliery

Outside.—Started erection of new breaker; shaft hoisting engines; No. 1 slope engines and No. 2 slope engines placed on new foundations, and new houses erected for the same; colliery supply store; colliery shop; extended brick compressor house, for accommodation of three stage air compressors.

Inside.—Eighteen inch by 30 inch hoisting engines and engine room in rock, on No. 2 slope anticlinal. Pumping plants on 5th, 7th and 9th, Red Ash levels, remodeled with the addition of two simple duplex pumps and two bore holes for water from Ross to Red Ash, thereby concentrating all pumping in Red Ash vein.

Reynolds Colliery

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

Inside.—No. 8 Rock plane, through Red Ash fault, 125 yards.

Wanamie

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

Inside.—Pumping plant No. 6 Red Ash slope; extending No. 6 slope through rock, 100 yards; No. 11 tunnel, Baltimore to Red Ash across basin No. 2 drift, 190 yards.

PARRISH COAL COMPANY

Parrish Colliery

One 8 inch bore hole for flushing; one crusher for crushing slate and bone, for flushing; one pair breaker engines; No. 6 slope extended 300 feet; intake air shaft, concreted from surface to rock; one 30,000 gallon water tank; one 20,000 gallon water tank.

Buttonwood

Tunnel driven from Kidney to Abbot vein about 560 feet; one 35 foot fan, also fan engine 22x36; one saw engine, etc., for cutting prop timber, etc.; outside railroad, plane and engine, for handling timber, etc., from railroad to head of shaft; concrete wall erected around coal shaft head, also around boiler house; one 30,000 gallon water tank.

PARRISH COAL COMPANY

Parrish Colliery

One Knowles pump, 18½x8x18 inch (inside); one compressor, 20x30 inch (Duplex); Norwalk compressor, 20x24 inch, set on concrete foundations; new compressor room, 46x56 feet, old Duplex compressor 24x36 feet moved from old building to new compressor building; one 12 foot fan for breaker; four new emery pickers for breaker; retimbering No. 1 slope for 206 feet from day-light to rock with 12x16 inch Georgia pine, with the exception of about 40 feet near surface, size 12x12 inch (inside); conducted 8 inch line for distance of 500 feet down slope, from air receiver at compressor room, size 36x36 feet (inside); elevated tracks from head of surface slope to foot of breaker plane 1,000 feet; all the above compressors located in new building on concrete foundations.

Buttonwood Colliery

Outside.—One engine 24x36 inch; two Norwalk compressors 28x30 inch; one engine, 12x14 inch, for carpenter shop; planers, etc., for carpenter shop; one Knowles pump, 14x7x12 inch; two 72 inch by 18 foot tubular boilers, 300 H. P.

Inside.—One tunnel 300 feet long from Hillman to Hillman; one pipe line 400 feet from boiler to head hoisting shaft.

DELAWARE AND HUDSON COMPANY

Plymouth No. 2

No. 10 plane driven through fault 350 feet, top Red Ash vein; No. 7 plane Stanton vein extended 650 feet; No. 4 slope extended 590 feet to boundary of Red Ash vein; No. 6 slope Stanton vein extended 200 feet; No. 7 slope Red Ash vein driven 300 feet to limit against fault; No. 8 slope Hillman slope driven 850 feet.

A new plane is being graded and equipped in Bennett vein through old outlet to No. 5 slope.

Pump room in Red Ash vein has been arched with masonry and brick.

Hillman landing has all been retimbered and planked preparatory to flushing culm over timbering.

Jeanesville pump, 22x12x36 inch, installed at Plymouth No. 1 in Hillman vein, pumping water to surface.

Plymouth No. 3.—New rope hole drilled and new engines 12¼x15 inch installed for No. 1 Cooper slope which has just been reopened after squeeze of 1903.

This Company is making an effort to prevent mine fires by erecting concrete and brick walls with iron I-Beams, thus eliminating the use of timber.

Condition of colliery is good.

PARRISH COAL COMPANY

Parrish

No. 6 Slope extended 400 feet. Baltimore vein graded this slope to top of an anticlinal, 426 feet, deepest cut 10 feet.

No. 7 Slope extended 252 feet, to synclinal Baltimore vein.

No. 8 Slope extended 1300 feet to Boundary Five Foot vein.

Pair of engines for above 12x14 inches.

A tunnel from No. 2 West Baltimore vein to Cooper vein 99 feet.

A tunnel from No. 6 Slope, 3 West Baltimore to Cooper vein 80 feet.

A rope haulage from No. 3 Slope, Baltimore vein, to Five Foot vein, a distance of 5754 feet.

Pair of engines for above 16x24 inches.

No. 9 Slope sunk along Southern Boundary in Five foot vein for a distance of 450 feet.

Pair of engines for above 10x14 inches.

Condition of colliery is good.

No. 2 Colliery, Buttonwood

No. 1 Plane, Abbott vein, extended 249 feet.

Installed a Knowles duplex pump, 18½x18 inches, in Abbott vein.

No. 3 Slope, Kidney vein, sunk a distance of 99 feet in rock and 129 feet in coal.

No. 5 Slope, Hillman vein, sunk 480 feet.

Pair of engines for same 12x14 inches.

No. 4 Slope Stanton vein sunk 700 feet.

Rock Plane for return from the Stanton to Hillman vein, 7 feet by 12 feet on 30 degree pitch, a distance of 117 feet.

No. 1 Tunnel, East Level, Stanton vein, reopened for a distance of 1800 feet.

Installed a rope haulage at foot of shaft to the foot of No. 4 Plane, Hillman vein, 600 feet, to foot of No. 2 Plane, Stanton vein, 1002 feet.

Pair of engines 14 inches by 20 inches for above.

Condition of colliery is good.

KINGSTON COAL COMPANY

Gaylord

Driving a traveling way for men and mules from surface to Cooper vein. When this is completed the shaft will be abandoned and all mule stables inside.

A tunnel has been driven from the Bennett to the Checker vein about 3 feet 8 inches in thickness.

Installed a conveyor line and Williams crusher for the purpose of breaking down all refuse from breaker and washing it into the mines.

Installed a pump for the purpose of pumping water to the top of culm plane, where bore holes have been put down, through which to wash culm into the mines.

Condition of colliery is fair.

No. 2 shaft.—Concrete for 79 feet from surface to rock, also retimbered from concrete to bottom, and head frame replaced.

New brick oil house erected 18'x28'.

No. 6 slope in Stanton vein extended 90 feet and stopped in fault.

No. 14 rock plane driven from Stanton vein 550 feet, cutting Hillman, Lance and Abbott veins, and intersecting a 8 by 6" bore hole from surface to rock a distance of 203 feet, for use of rope to operate place.

Plymouth No. 3 Colliery.—Red Ash sump lengthened 450 feet.

No. 6 slope in Red Ash vein opened and driven 260 feet.

No. 15 rock tunnel driven 460 feet from bottom to top Red Ash vein.

Rock tunnel driven 100 feet from Stanton vein to tap shaft for ventilation.

Plymouth No. 4 Colliery.—No. 11 plane, Top Red Ash vein, extended 170 feet.

Plymouth No. 5. Colliery.—Boiler house erected 50'x60' and two Sterling 300 H. P. water type boilers installed.

Boston Colliery.—No. 13 plane, in Bottom Red Ash vein, extended 300 feet.

PARRISH COAL COMPANY

Parrish Colliery.—A rock plane driven from Baltimore vein to the Five Foot vein for ventilation, a distance of 279 feet, size 7' by 18' on a grade of fifteen degrees.

Sank No. 6 slope Baltimore vein a distance of 200 feet.

Buttonwood Colliery.—Sunk No. 4 slope, Stanton vein, a distance of 300 feet, to the boundary line.

Installed a new engine on top of Stanton plane, for plane and slope, geared 18" by 30" (double engine) 460 H. P.

Sank a slant slope from top of No. 2 slope Hillman vein 600 feet, to mine coal in a synclinal between two rolls.

A new plane driven on the Abbott vein 900 feet long, and a pair of geared engines 12" by 16", 124 H. P., installed.

A tunnel driven from the Kidney vein to the Abbott vein, to strike the vein at the southern boundary line, a distance of 470 feet size 7' by 12.

KINGSTON COAL COMPANY

Gaylord Colliery.—The old cylinder boiler plant has been dispensed with and 900 H. P. B. and W. boilers have been erected and installed in brick house. Said plant has been completed with duplicate feed pumps, Cochran water heater, etc.

A new brick house has been erected for electric generator and air compressor.

Two new 7½ ton electric locomotives have been purchased and electric haulage is in course of construction between the foot of the Bennett slope and the Red Ash.

A new washery or wet side addition to the breaker is in course of construction and almost completed, with three banks of shakers, duplicate rolls, duplicate elevator.

A Compound Duplex 28"x36" pump is being installed.

EXPLOSION OF GAS AND DYNAMITE AT PARRISH COLLIERY

On January 9, 1912, at about 4.45 p. m. an explosion of gas and dynamite occurred in No. 1 West gangway, No. 9 slope, Five Foot vein, resulting in the death of Henry Miles and August Garblin timbermen, Elmer Jones and John Humphreys, company men, Paul Reshofski, miner and Anthony Goholes, laborer.

The first intimation of any trouble occurred at 8 o'clock that morning. The driver took his mule in the gangway for the purpose of bringing out a loaded car. When the door tender attempted to open his door to allow the driver to pass out he found he was unable to open it. They called the gangway miner out to make an examination of the roof and he declared it unsafe, as the roof had commenced to work as shown by the effect upon the door.

It appears that it was the custom in this section of the mine to blast down the top rock instead of taking up bottom rock, as is the custom in some places for the height of car. The top rock in this gangway in many places proved, upon examination, to be very treacherous. At the point where the door was located the vein had increased in thickness giving sufficient height for the car and did not require any blasting down of top rock. This so-called bridge of rock, which was about 30 feet long and 18 inches in thickness, the entire width of the gangway, was pronounced to be solid and in good condition. However, when the doortender was unable to open his door and after the examination by the miner, the fire boss, Thomas Richards, who was in close proximity thereto, was sent for. He arrived shortly afterward, and also made an examination of the roof, and instructed the miner to assist him in setting a few props to relieve the condition until such time as the timbermen could be notified and this portion of the gangway placed in a safe condition. Mr. Richards also instructed the miners inside of the door to quit work for the remainder of the day, which order was readily complied with. The fire boss explained the conditions to Evan Thomas, the mine foreman, at noon. The mine foreman afterwards instructed his assistant, David Davis, to go where the trouble was and make a personal examination and report to him the result of his inspection. The assistant foreman arrived at 3 p. m. and called the foreman over the telephone, from 1 West Five Foot, to send in the timberman that was employed at night. The miners employed in the chambers outside the bad roof remained at work during the entire dav or until about 4 o'clock. John Ayers, the runner in this section of the mine, came out of the gangway at 4 o'clock. The night shift driver and doorboy went into the gangway at 4.15 to see if the gangway miner wanted a car to load rock, and not finding any one present in the face they came out of the gangway and immediately went up to No. 2 Counter. The boys claim that when walking in and out the gangway they carried naked lamps on their caps. About 4.45 the timbermen arrived to take down the bad roof on the gangway, and with them were Paul Reshofski and Anthony Goholes, who had been instructed by the foreman to work with the timbermen on this shift. These men had just arrived at the junction of the gangway and No. 1 Counter road and a short distance inside the main doors, when a terrific explosion occurred that instantly killed six men and slightly injured two others, Ed-

ward Beynon and Anthony Likowitch. Beynon was following the timbermen to ask them for some oil and was a short distance behind them. Likowitch in some mysterious manner was saved. James Wolfe, who was employed as fire boss in No. 10 tunnel, Hillman vein, and who was approximately 1,500 feet from where the victims were discovered, felt the concussion and heard the slamming of the doors. Knowing that something unusual had occurred in the Five Foot vein, he hastened in that direction and cautiously using his safety lamp he tested repeatedly for gas until he finally reached the men, on seeing their condition he returned to the Hillman vein to get help from some foreigners, who were there employed, but they refused to assist. In the meantime word had been sent through the 'phone to the foreman's office, and in a short time plenty of help was on hand.

The concussion extinguished the naked lights of those employed on No. 2 Counter, but their safety lamps remained lighted. They were working on the same split and the return end of the district. They did not seem to be in any great hurry to leave their places after the explosion, but finally grouped themselves together, ten minutes after the accident had occurred, and came down No. 1 Counter upon the victims, and continued out the gangway to where the air was good. These men claim that the smoke through which they walked was pungent and white in color and very dense, although they were able to keep their safety lamps lighted. It was proved by those who had last visited the gangway that no fall had occurred to hamper the ventilation and that the place was in normal condition with the exception of the one piece of bad roof, which had been temporarily propped.

The problem that confronted the officials of the mine was, what created the explosion so soon after the day shift men had departed for their homes as the miners themselves claim they left their places in good condition, perfectly free from gas. I made an effort toward an investigation the next morning but was not able to advance more than 50 feet beyond where the men were found, owing to a large accumulation of gas. The explosion had deranged the ventilation to such an extent that practically the entire quantity of air was short circuiting, leaving the district without any circulation and allowing the entire section to fill up with explosive gas.

Men working with locked safety lamps were employed to build walls and doors and to restore the ventilating current to its normal condition.

In a few days we were able to reach the face of this gangway also the faces of the chambers, and proceeded to investigate the cause of the accident. We found that great havoc had been wrought, especially in chambers Nos. 47, 48 and 49. The props had all been dislodged from their position and blown toward the gangway, allowing the roof to fall almost the entire length of the chambers. Several local falls had occurred on the gangway and not a vestige of a check door or brattice had been left. The destruction was plainly visible and it appears that the force of the explosion came from the chambers, as timber and other debris, including the empty car that stood upon a chamber road, had all been picked up and dashed against the lower pillar of the gangway, the greatest force being out towards the men, judging from the position of the timber lying upon

the floor of the gangway. A small portion much farther in seemed to have leaned towards the gangway face. The timber in the face of the gangway and close thereto, was undisturbed. The victims had arrived just within the explosive zone. The main doors immediately in the rear remained intact, except a portion of the masonry over and upon the side of the inner door, which was somewhat damaged. It was known that the timbermen had in their possession 16 sticks of dynamite, which was thought to have exploded in some unaccountable manner. Likowitch claimed he had 8 sticks, 4 in each side pocket of his coat, while going in. Upon his return after the explosion while passing through the main doors it suddenly dawned upon him about the dynamite that he carried and placing his hand in his pocket he could only find 4 sticks, which he threw away the remaining 4 sticks could not be found. August Garblin carried 8 sticks in his hand held by a wire. His body was somewhat mutilated, but not to the extent, in my opinion, that he would have been if the dynamite that he carried had exploded, as I fully believe that when the explosion occurred the dynamite that he carried was scattered in all directions and assumed the appearance of the very dust itself, which made it exceedingly difficult to find.

Henry Miles, the chargeman, was in possession of a safety lamp, and later on when the work of cleaning was well under way the lamp was discovered.

After a most thorough investigation, I have arrived at the following conclusion:

That a box containing black powder and giant powder located between chambers Nos. 51 and 52 was the source whence the trouble originated. It was plainly evident that a 25-pound keg of black powder had exploded, due to a spark having been dropped into the box on a piece of burlap, with which the miner at times carried his dynamite. As the box was perfectly dry the fire increased and soon came in contact with the powder, which exploded, also fusing 25 pounds of dynamite. The miner's box, although its parts, except the lid, remained intact, was burned to a crisp. Taking into consideration that the vein in this section is less than 5 feet in thickness, the energy expended on the air resulted in check doors and brattice being blown down, deranging the ventilation and allowing gas to accumulate. This gas coming in contact with a small feeder that had probably been ignited by the flame of the powder, created an explosion. The gas flame in spreading reached other black powder and dynamite simultaneously, which propagated and greatly intensified the explosive force. The reason why no afterdamp remained in the air, for no odor could be detected after the explosion except that of the giant, nor did any of the workmen who were at work on Nos. 1 and 2 Counters feel any ill effects from this gas when the gas was ignited and before combustion was completed, was that the concussion of dynamite being so violent it extinguished the gas flame and by its compression cleared the district of air and gases. There is no evidence that a gas flame had been exposed a sufficient length of time to even scorch the brattice boards or bark upon the props, for wherever there appeared on the gangway pillars a shelf or projection or crevice in the roof, there was found torn and ragged pieces of wood, which showed that the victims were blown and struck with flying missiles that filled the air. It appears that the

miners in this section of the mine used giant and black powder for each blast in cutting their coal, which is considered a most dangerous practice and contrary to the Anthracite Mine Law. Each miner having a 25-pound box of giant as well as 25 pounds of black powder, there was established a veritable magazine in this section of the mine, which could under various conditions, while they were engaged at their work, have created an explosion that would have resulted in the death of every person in this gangway. When the section was cleared of its falls and ventilation was properly restored, and they were ready to resume operations, dynamite was prohibited to be used for blasting coal and permissible powder recommended, which some of the men reluctantly accepted, seemingly indifferent to the great danger of having a large quantity stored and the reckless manner in which it was used by them.

The following verdict was rendered by the jury:

"We find that Elmer Jones, Paul Reshofski, August Garblin, Henry Miles, John Humphreys, and Anthony Goholes, met their deaths from injuries in the No. 1 West Gangway of the Five Foot vein, of the Parrish Coal Company, at Plymouth, on the afternoon of January 9, 1912, by an explosion of gas in the said gangway, and that the said gas was ignited by a naked light of August Garblin, one of the men killed. We further find that the said Parrish Coal Company and its officials were negligent in sending men into said gangway, knowing that the roof was working and likely to generate gas, without first sending the fire boss to ascertain whether or not the said roof was in good condition.

(Signed) C. W. ZERBY,
ANDREW T. RYSCAVAGE,
SIMON CARPENTER,
HUGH TORMAY,
WILLIAM BUTLER,
CHARLES TREBILCOX."

CONDITION OF COLLIERIES

KINGSTON COAL COMPANY

Kingston No. 2 and Gaylord Collieries.—Safety conditions, ventilation and drainage, good.

DELAWARE AND HUDSON COMPANY

Plymouth Nos, 2, 3 and 5 Collieries.—Safety conditions, ventilation and drainage, good.

LEHIGH AND WILKES-BARRE COAL COMPANY

Nottingham No. 15 and Lance No. 11 Collieries.—Safety conditions, ventilation and drainage, good.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Woodward, Avondale and Loomis Collieries.—Safety conditions, ventilation and drainage, good.

Parrish Colliery.—Inside: Completed 3 concrete and steel air bridges; 4 concrete engine houses; 3 concrete pump rooms, and 4 concrete barns in Baltimore vein. Made new intake for manway in Five Foot; 3 rock planes 160 feet, and a rock shaft 55 feet to improve ventilation. Drove a tunnel 400 feet long from Baltimore vein to Top Baltimore, and made an opening to Five Foot vein, for safety; also a tunnel 300 feet long from Baltimore vein to Five Foot, for production. Made two 10-inch bore holes from Parrish Baltimore vein to Hillman vein Buttonwood colliery, for new pumping plant, a total of 495 feet. Reopening through a "squeezed" area in Top Baltimore vein a distance of 1,200 feet. Made a new airway along a fault in Hillman vein a distance of 650 feet, to remove doors from haulage road. Silting operations have been carried on extensively during the year.

Outside. Washery was enlarged.

PLYMOUTH COAL COMPANY

Dodson Colliery.—Inside: Built a stable in Red Ash vein to accommodate 24 mules; engine house at West slope Red Ash vein; engine house East slope, Red Ash vein; pump house foot of rock slope, Red Ash vein; engine house at head of rock slope, Bennett vein; all of concrete and steel, also built a hospital of concrete in Bennett vein, and an office room of concrete and steel at foot of shaft. Placed 48 sets of steel timber at head of rock slope, Bennett vein, 18 inch "I" beam collars 8 inch H section legs. Installed in Bennett vein at foot of shaft one 28 by 10 by 36 inch Duplex Jeanesville steam pump; in Red Ash vein at foot of rock slope one 24 by 10 by 18 inch Duplex Scranton pump, and also one 11 by 18 inch Duplex Jeanesville electric pump driven by 150 horse power General Electric motor.

Outside.—Installed one 21 by 36 by 33¼ by 20¼ by 30 inch Ingersoll-Rand air compressor, cross compound, non-condensing Corliss engine, running 120 revolutions per minute and producing 3,300 feet of free air per minute. Installed one 16 by 26 by 30 inch cross compound non-condensing Corliss breaker engine to operate breaker, speed, 85 revolutions per minute.

Lance No. 11 Colliery.—Inside: Completed No. 8 slope, Top Baltimore to Bottom Baltimore; No. 28 slope, Bottom to Top Red Ash; and No. 29 tunnel, Top Baltimore to Five Foot. Installed a 10 inch by 36 inch compound pump in Hillman vein.

Parrish No. 23 Colliery.—Inside: Completed No. 1 slope, Baltimore to Baltimore; and built a new barn. Installed electric haulage on 2nd West Baltimore and a centrifugal pump and gravity water pipe to No. 14 tunnel.

Buttonwood No. 22 Colliery.—Inside: Completed No. 10 tunnel, Kidney to Abbott; No. 11 tunnel, Stanton to Stanton; and No. 12 tunnel, Surface to No. 6 vein. Installed electric haulage on shaft level and 2nd East, No. 2 plane; also new pumping plant on shaft level.

Outside: Erected colliery shop, breaker engine-house hoisting house, timber yard and saw mill. Reconstructed the power plant and boiler plant. Installed electric haulage, Buttonwood to Inman No. 21, and breaker wash pump and reservoir.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Woodward Colliery.—Steam generators have been replaced by electric motor generators. Electric power is being generated at the Nanticoke power plant and transmitted by high tension lines, transformed and stepped down as necessity demands at the colliery.

Concrete walls and I beams have been placed around the shafts, thus reducing the fire risk considerably. Completed several rock tunnels for development and ventilation purposes.

Installed two 20-foot fans outside.

Loomis Colliery.—Completed a new shaft known as Loomis No. 3, near Butzbach's Landing, from surface to Hillman. Preparations are being made for the widening out of the Old Dundee shaft.

Avondale Colliery.—Completed reopening of the Red Ash vein; also second opening for No. 9 tunnel, Ross to Hillman, to be connected at the Five Foot vein. The Ross vein section, No. 5 slope, is still under water. Installed pumping equipment to remove the water from this colliery, the flooding of which was caused by the inflow of a large quantity of water from the Susquehanna River bed after the squeeze of November, 1910.

KINGSTON COAL COMPANY

Kingston No. 2 Colliery.—Inside: Completed two tunnels, one from Cooper to Bennett vein, and the other from Cooper to Lance vein, for haulage and second opening, also a tunnel in No. 3 shaft through roll in the Eleven Foot vein. Installed an electric hoist in No. 1 plane, Ross vein; and a new system of culm and surface clay and rock flushing. An emergency hospital was built near the main turnout of the Eleven Foot vein in the slope. The sides around the foot of No. 2 shaft were reinforced with concrete-steel.

Outside: Installed a new 6-inch bell mouth water line, 2,400 feet in length from fresh water tanks for fire emergency, and a new 8 inch by 6 inch by 10 inch Scranton Duplex pump. Fitted up brick

CONDITION OF COLLIERIES

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance No. 11, Nottingham No. 15, Inman No. 21, and Buttonwood No. 22 Collieries.—Safety conditions, ventilation and drainage, good.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Avondale, Loomis and Woodward Collieries.—Safety conditions, ventilation and drainage, good.

DELAWARE AND HUDSON COMPANY

Plymouth Nos. 2, 3 and 5 Collieries.—Safety conditions, ventilation and drainage, good.

KINGSTON COAL COMPANY

Kingston No. 2 and Gaylord Collieries.—Safety conditions, ventilation and drainage, good.

GEORGE F. LEE COAL COMPANY

Chauncey Colliery.—Safety conditions, ventilation and drainage, good.

WEST NANTICOKE COAL COMPANY

West Nanticoke Colliery.—Safety conditions, ventilation and drainage, good.

PLYMOUTH RED ASH COAL COMPANY

Red Ash Colliery.—Safety conditions, ventilation and drainage, good.

IMPROVEMENTS

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance No. 11 Colliery.—Completed No. 30 tunnel, Hillman to Stanton; tunnel, Baltimore to Baltimore off No. 4 slope; and No. 31 tunnel, Baltimore to Cooper vein.

Nottingham No. 15 Colliery.—Completed No. 6 tunnel, Top Ross to Ross. Installed a 14 by 48 inch pump on shaft level, and a new pumping station on 11th East.

Inman No. 21 Colliery.—Completed East tunnel from Hillman shaft level.

Buttonwood No. 22 Colliery.—Installed an electric pump on No. 3 slope, and an electric hoist on No. 13 slope.

In the Parrish mine an electric haulage was installed on No. 13 slope, also two electric locomotives. Completed No. 10 tunnel, and

tunnel airway, Abbott to Abbott; No. 15 tunnel, Baltimore to Five-Foot; No. 9 rock plane, Stanton to Hillman, and rock slope on shaft level.

Outside: Completed an oil and lamphouse, washhouse, lumber shed and motor house. Installed a 27 by 40 by 22½ by 30 inch air compressor and fuel conveyor.

At the Parrish, changes were made to breaker so as to connect with washery operations. Completed lamphouse and inside foreman's office, oilhouse and blacksmith shop.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Avondale Colliery.—Completed rock tunnel from Ross vein across measures to Hillman vein, a distance of 1650 feet, and made a second opening for same; also rock tunnel through fault in No. 10 slope and rock return airway, parallel with No. 2 slope, to assist in ventilating the live workings. Built a blacksmith and carpenter shop of concrete and brick. Installed pumps for unwatering the mine workings flooded in November, 1910, and pumping equipment in No. 5 slope section of Ross vein. The installation of this pumping equipment has been very costly and the expense of reopening the colliery shows that to mine anthracite coal in the Wyoming Valley requires capital, as the dangers from flooding are quite imminent.

Loomis Colliery.—This colliery is, perhaps, the most wonderful operation of its kind in style and construction, that has ever been erected in the anthracite region. The breaker building and annex or washery is practically fireproof, and is constructed of concrete, steel and wire glass, and all the other buildings are most modern in their equipment. The breaker will be completed during the year 1916. It is electrically operated, with separate units, and is expected to have a large capacity. There are already miles of gangway developed, so that a large tonnage might be expected as soon as the breaker is placed in operation. The work of sinking No. 3 shaft, near the Susquehanna River, is underway. The shaft will be sunk to a depth of about 660 feet to the Hillman vein. The old Dundee shaft is also to be widened and sunk to the Ross vein bed.

Woodward Colliery.—Preparations are now being made to reconstruct the breaker of concrete, steel and wire glass; this building was placed in operation during the year 1888. It has been a large producer for the past ten years. It was the first breaker that prepared 1,000,000 tons of coal in a year, which was accomplished in 1905. Side walls are being built and "I" beams placed for roof support, instead of ordinary mine timber along the haulage roads. This is in line with the progressive movement established some years ago by this company. Completed the driving of rock tunnels for the necessary development and transportation of the coal.

DELAWARE AND HUDSON COMPANY

Plymouth No. 2 Colliery.—In November the breaker was abandoned and the coal is now being prepared at Plymouth No. 5 breaker. Completed a tunnel, 290 feet, from the Stanton vein to the Hillman vein.

Installed machines, tools, etc., in machine shop. Built bridge to No. 3 shaft. Installed one 500 rotary converter, transformers, etc., loaded and retail scales, main conveyor line from Nos. 1 and 2 shafts to breaker. Placed a concrete floor in compressor and fan house.

Avondale Colliery.—Built a blacksmith, carpenter and machine shop.

Truesdale Colliery.—Completed rock tunnel, 453 feet, in Bottom Red Ash vein; rock tunnel, Mills to Hillman vein, 222 feet in length; rock skip No. 4 west airway, No. 1 slope, Mills vein; surface rock slope, No. 20 tunnel, length 780 feet; rock plane from George to Mills vein, length 249 feet; Rock tunnel, Red Ash to Ross vein, No. 2 slope, length 72 feet; rock tunnel, No. 3 slope, for passing branch, length 87 feet; extension of No. 9 slope in rock, length 363 feet; extension of No. 8 tunnel, Cooper to Hillman vein, length 370 feet; second opening rock plane from Top Red Ash to Ross vein, length 61 feet; second opening to No. 2 west lift, No. 6 slope, Hillman to Mills vein, length 87 feet.

Installed one 500 steam hammer for blacksmith shop; motors in three small air hoists; 7-ton locomotive with reel, etc., in No. 2 East lift, No. 6 slope; 7-ton locomotive with reel, etc., in No. 1 slope, Mills vein; 7-ton locomotive with reel, etc., in No. 3 east lift, No. 7 slope; and steam hoist for Forge vein plane, No. 1 tunnel.

LEHIGH AND WILKES-BARRE COAL COMPANY

Sugar Notch No. 9 Colliery.—Completed No. 31 tunnel, Twin to Hillman; No. 33 tunnel, Five Foot to Hillman; No. 34 tunnel, Red Ash to Twin; and No. 32 tunnel, Twin to Hillman.

Maxwell No. 20 Colliery.—Completed No. 31 tunnel, Red Ash to Ross; and No. 30 tunnel, Hillman to Kidney.

Buttonwood Colliery.—Completed No. 10 tunnel and tunnel airway extension to Abbott; tunnel No. 4 to No. 4 vein, and No. 16 tunnel, Abbott to Abbott.

At Inman No. 21 shaft, completed concrete and steel timbering, Hillman shaft level.

Outside: Installed one 32 by 48 inch duplex Corliss valve shaft engine for Hillman shaft, and also one for Baltimore shaft at Inman No. 21. Also built a brick engine house. Two steel head-frames, one for Baltimore shaft and one for Red Ash shaft, were built.

At Parrish washery, a 600 H. P. boiler plant was installed for Parrish slope.

LEHIGH VALLEY COAL COMPANY

Warrior Run Colliery.—Built a new concrete hospital in No. 4 tunnel level.

Outside: Constructed 2,000 feet of new 4 by 8 foot flume to carry creek and surface waters. The old flume was destroyed and washed out by cloudburst of June 27, 1916.

Franklin Colliery.—Completed No. 33 tunnel, from Baltimore to Sump vein; extension of No. 34 tunnel from Ross to Skidmore vein. Started driving No. 35 tunnel from Skidmore to Skidmore; No. 36 tunnel, from Skidmore to Skidmore through an anticlinal; No. 37 tunnel, Sump to Sump vein through fault; and No. 11 tunnel, on No. 4 tunnel level to the breaker.