

they have concluded to leave the shaft for the present at this depth, and proceed to work the Hillman seam as soon as a second opening can be effected to the Stanton air-shaft, where it is intended it shall be made.

The Delaware and Hudson Canal Company.

At the Laurel Run mine a short tunnel was driven from the lowest split of the Baltimore seam, a distance of 129 feet and 7×12 feet area, to the checkered vein $5\frac{1}{2}$ feet thick, from which that seam will be mined to a more or less extent, and there is a large area of it intact.

At the Conyngham shaft, a pair of new fans $17\frac{1}{2}$ feet diameter was erected to supersede the old one, which proved inadequate for the ventilation required in the mine. These fans are of Mr. Scharar's pattern, and are giving satisfaction.

At the **No. 5 shaft**, Plymouth, a second opening was effected to the workings of the Cooper seam by sinking a shaft thirty feet depth and sixteen feet area, which can be used as an escape for the men in case it be required.

The Susquehanna Coal Company.

This company has under way a number of improvements, some of which are the following: At the Grand Tunnel, the water was pumped out of the old slope workings, with a view of re-opening them and sink a slope to mine the coal lying below these workings, of which a large area lies intact.

A large air-shaft is in progress of sinking for the purpose of ventilating the No. 4 slope and other workings, which was, at the end of the year, 160 feet deep, having an area of 13×18 feet, upon which, when completed, a pair of double fans will be erected to create the ventilation.

At No. 2 shaft, a new slope was sunk from the level of the shaft to a length of 381 feet, and is still in progress of sinking at this writing. It passed through a series of rolls, but is now opening a track of good coal, in which two lifts have already begun to be mined. A new tunnel is also in progress, and has already reached a length of 672 feet, having an area of 7×15 feet, which is destined to open the Ross and Twin veins at that level.

The No. 4 slope is being extended also, and had reached a depth of 318 feet from the old foot at the close of the year.

The Wyoming Valley Coal Company.

This company bought the Albright Coal Company's colliery, formerly called the Ellenwold, and they have pumped the water out of the shaft and are mining the coal from there since. A new fan was also erected on the air-shaft, a description of which can be seen in the table of New Fans in this report.

The Kingston Coal Company.

Another new shaft is in progress of sinking for the Red Ash seam by this company, the size of which is 10×30 feet; and it was down over 200 feet at the close of the year 1882.

100,000 cubic feet per minute, the quantity of gas issuing was sufficient to make the whole current explosive, and it was maintained in that condition during a period of from three to four weeks. During this time the mine was kept idle, and no one was permitted to enter with any light but that of a safety lamp.

Cave at the Hillman Vein Colliery.

In this mine the Hillman seam is worked right over the section which caved in the Hollenback mine. The distance between the Baltimore and Hillman seam is about 300'. At about 8 o'clock A. M., June 12, the officials of the colliery having already been apprised of the existence of a "squeeze" in Hollenback mine beneath them, were on the alert, watching for its effects, they noticed the pillars suddenly beginning to crack and crumble and at once sent the workmen out. At about 12 o'clock it fell in, closing the most of their workings. A large quantity of explosive gas simultaneously appeared, and mixed with the air, charging it so that the whole became explosive and continued so for several days. Explosive gases escaped from crevices on the surface at several points and caused some alarm among the inhabitants lest accumulations would take place in the cellars of their houses, but care was taken to caution them against taking lights into the cellars until it was ascertained that no danger existed.

No naked lights were used in this mine until the workings and airways were re-opened and the ventilation restored so that no dangerous bodies of fire-damp existed therein.

Cave at the Boston Mine.

In the month of April a small section of the workings of this mine in both the Bennett and Cooper seams caved very suddenly at a point where the pillars were large and regular in thickness. It did not damage the mine-workings much except that it permitted a large volume of water to flow in and flood a large portion of the workings. The surface over this point consisted of a depth of coarse, sandy gravel, but no body of water was known to exist there. However, the large volume which found its way into the mine through this cave, proved that an accumulation existed somewhere beneath the gravel, and it is supposed that the hydrostatic pressure developed by this water was the originator of the squeeze and the cave-in. No fire-damp appeared in this case.

Cave at Nos. 2, 3 and 5 Collieries at Plymouth.

These three mines worked different seams, over or above each other. In **No. 5 colliery**, the Bennett and Cooper seams were mined. In No. 2, the Five-foot and Hillman were mined, and in the No. 3 the Five-foot and Cooper seams were mined. The three were old collieries having very extensive workings, all nearly exhausted of coal. For a few days

prior to the 10th of September, a squeeze was noticed in a few pillars in the eastern workings of the Bennett vein in the No. 5 colliery. It spread with amazing rapidity from pillar to pillar in all directions during a few hours before it caved. Work was in progress in the three mines on that day and no indications of trouble in neither No. 2 nor No. 3 were perceptible until a short time before the day's work was over.

No one expected an extensive cave, and no preparation for that was made, but at about 8 o'clock P. M., September 10th, at least one hundred acres of ground sank a few feet, and an equal area of workings collapsed affecting the workings of the three collieries. Caves of this extent invariably prove damaging, and this proved so to each of the mines.

In No. 3 it extended to the underground barn and killed three of their mules. The others very narrowly escaped uninjured.

An increased quantity of water found its way into each of the mines and in Nos. 2 and 5 extra pumping machinery had to be put in, as the inflow of water proved to be much greater than their pumping engines were able to pump out. The mines were idle for several weeks, and though the coal had nearly all been won, it was a severe loss and a cause of much disadvantage that the workings caved so unexpectedly.

ABANDONMENT OF THE DIAMOND MINE.

Work was permanently suspended at this mine on the 31st day of January, 1889. It had been in operation since the year 1871 when the shaft was completed and the workings connected to those of the Old Mordacai workings. In the year 1872 the inspector reported this as an extensive mine, having a natural ventilation of 19,360 cubic feet at inlet. Then they had steam boilers and a steam engine inside, the heat of which assisted in producing the ventilation. Since then the boilers have been taken out and fans provided to furnish ventilation. The workings caved twice causing the mine to fill with fire-damp; but, with care and good management, it was cleared in both cases without injury to anyone. Once a fire took place and this could not be extinguished without flooding that portion of the workings with water.

Both the Baltimore and Hillman seams were worked out and exhausted, leaving the old workings connected with those of the Empire in both seams, and with those of the Hollenback and Baltimore tunnel in the Baltimore seams. As long as these other collieries are kept at work the workings of the Diamond should also be well ventilated and closely watched.

ECONOMY OF WORK IN THE CONSTRUCTION OF MINE CARS AND CAR WHEELS.

In view of the great improvements that have been made in anthracite preparing, hoisting, pumping, ventilating and general mining ma-

they should always be withdrawn when it is seen that their work does not produce the desired effect, and this can at all times be determined several hours before the collapse or final cave-in occurs. In all the caves that occurred in this district during 1896 the men were all withdrawn long before the cave took place. Caves of more or less extent took place in each of the following mines:

In the old workings of the No. 5 colliery at Plymouth a squeeze started in the latter part of 1896 and extended into the workings of the Boston and afterwards into the workings of the No. 3 colliery. On account of this, the Boston and No. 3 were suspended during the month of January, and No. 3 worked only two days in February. Considerable damage was done to both mines, but No. 3 has been re-opened and is now in fair condition.

In July another squeeze occurred in the Baltimore seam workings of the Boston mine, east of the slope. This affected all the work in that seam. The workmen were all withdrawn and they have done no work in that seam since, but they can mine the remaining coal again when needed. In the early part of February a squeeze appeared in the old workings of No. 5 Plymouth which extended down into the workings of No. 2 and affected the two seams. It did considerable damage to the openings, and the company concluded to leave all stand for the present and sink the shaft to the Red Ash seam. They have not shipped any coal from there since April, 1896.

In the Hillman workings of the Conyngham mine the damage done by a squeeze in 1895 was repaired ready for work in the latter part of January, 1896, but it recommenced in July and affected the upper seams so that they did not get in condition to mine coal up to the end of the year.

For the first three months of the year a squeeze was in progress in the workings west of the planes in the Empire mine, but it abated without doing much damage, although quite a large area had closed in. In the latter part of November another squeeze took place in the workings east of the planes. This required the suspension of all work on the planes for the remainder of the year and has caused great loss to the company and the workmen.

The Method of Mining in this District.

The method or system by which the largest quantity of coal can be extracted from a given area of land with the greatest degree of safety to the employes and at the least cost is the desideratum in every coal field.

Coal is too valuable to leave in the earth if it is practicable to extract it. The plan or system which enables the miner to extract the largest quantity, per acre of land, with equal degree of safety is certainly the best and most economical method.

Plymouth No. 1.—Foot of shaft in Hillman vein, has been cleared up and very heavily timbered. Large sump driven below shaft in vein, and a duplex Janesville pump, 22x10x36 feet, has been installed. Began pumping October 1. Capacity, 1,000 gallons. This work has all been done preparatory to sinking the shaft down to the Bennet vein.

The Plymouth Pumping Plant.—A pump room, 17x59 feet, with offset 10x15 feet 6 inches. Stone side walls and brick arch. A Janesville compound duplex, 26x50x16x48 inches, with a capacity of 3,000 gallons, has been put in place. This pump is provided with a pump condenser. In connection with it there has been completed a 20-inch more hole for pumping water, which is 585 feet in depth.

Plymouth No. 2.—Car haul at foot of shaft, Red Ash vein, 70 feet long. Elevates empty cars to run back to slope, 400 feet away. No. 2 slope, in 5-foot vein, extended 300 feet. Ten-inch bore hole for flushing culm. High pressure boiler plant, four locomotive type of boilers in use; 78x28 feet 2 inches; brick boiler house, 54x81 feet. Boiler house is large enough for six boilers. Three cylinder boilers added to boiler plant.

Plymouth No. 3.—Completion of sinking shaft to bottom Red Ash vein, making total depth of shaft about 750 feet. Foot opened out about 50 feet on each side of shaft.

No. 7 tunnel through fault in Hillman vein, on shaft E gangway; 207 feet in length.

No. 9 tunnel from Five Foot to Stanton vein, about 400 feet.

No. 10 tunnel from Hillman to Lance vein, 259 feet long. Are driving plane airway in Lance to connect with airshaft. Now up 300 feet.

Abbott slope from outcrop to D. Low line, 450 feet long. Are driving gangways and airways east and west.

Six-inch bore hole for drawing Abbott, Lance, Five Foot and Cooper veins to Bennet vein and Plymouth pump plant at No. 1. Extension No. 1 air shaft to Five Foot vein, about 40 feet.

Plymouth No. 4.—No. 2 slope, in Ross vein, down 300 feet, going. No. 1 slope, in Red Ash vein, extension 200 feet, going. Rope hole for Ross slope. Pair engines, 18x36 inches, first motion. Frame engine house, 20x32 feet. Rope haulage, 900 feet long. Endless rope transporting cars from No. 4 to No. 5. Engines, pair 10x12 inch.

Plymouth No. 5.—Completion of No. 3 plane, in Red Ash vein, to connect No. 4 colliery. Plane, 2,200 feet long, operated by pair engines, size 22x48 inches, at No. 4 colliery. Rope is taken down No. 4 air shaft. No. 4 plane in No. 4 tunnel, Five Foot vein, 400 feet long. Connection of top split working with air shaft and hoisting shaft for second opening.

Boston.—Extension of No. 4 plane in top split of Red Ash through.

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Plymouth No. 3.—Foot in Red Ash vein has been opened out, and is now connected with slope sunk from Boston vein. This slope is now an engine plane for No. 3.

No. 9 tunnel to Stanton vein completed 563 feet.

New fan, 10x28 feet, in brick engine house 48x48 feet, ventilating Red Ash vein, running since July.

Plymouth No. 4.—No. 2 Ross slope down 2,200 feet; still driving.

No. 1 Red Ash slope down 2,250 feet, still driving.

No. 7 plane, in Red Ash up 600 feet; still driving.

Plymouth No. 5.—No. 5 plane, in Red Ash, top split, up 500 feet; still driving.

Boston.—No. 4 plane, top split, Red Ash, completed up 1,400 feet.

Improvements by the Susquehanna Coal Company During the Year 1900.

Stearns.—No. 4 shaft, sunk 205 feet to 651 feet total depth.

No. 4 air shaft sunk 553 feet to 663 feet, total depth.

No. 5 shaft, sunk 172 feet to 220 feet, total depth. The sinking of these three shafts is now completed.

Rock foot No. 4 shaft driven 80 feet.

Nanticoke.—No. 14 slope, Lee seam, Nanticoke, rock work for head completed.

No. 12 rock plane, from Lee toward Ross, driven on 20-degree pitch 100 feet.

No. 13 rock plane, 7x14 feet, 20-degree pitch, driven up 100 feet from No. 21 tunnel, completed.

Outside Improvement—New narrow gauge railroad, three miles, from Nanticoke to Stearns.

New compressor plant for No. 14. Slope engines, Nanticoke, Pa. Engines to be inside at head of slope, and compressed air to pass through bore hole.

One thousand horse power new Babcock & Wilcox boilers, No. 5 breaker, Nanticoke.

One thousand horse power new Babcock & Wilcox boilers, No. 1 shaft, Nanticoke.

Improvements by Delaware, Lackawanna and Western Company During the Year 1900.

Woodward.—One 500-horse power engine directly connected with one G. E. 330 K. W. Multipolar Electric Generator.

One 80-horse power electric hoist in the Cooper seam.

One 120-horse power electric hoist in the Red Ash seam.

One 7x8-inch Triplex electric pump, 20-horse power motor.

this most dangerous enemy to the underground worker. I am glad to be able to report to you at this date that we are led to believe that we have succeeded in surrounding this affected district with incombustible material to prevent further spreading of the fire, and expect to be able to report in the near future that this destructive fire has been taken care of.

Woodward Colliery

Outside.—The improvements at this breaker during the year consist of labor-saving machinery, automatic slate pickers, conveyors, elevators, shakers, etc., together with a 15-foot dust fan which is materially assisting in improving the conditions at this breaker.

Inside.—The installation of two $7\frac{1}{2}$ ton electric locomotives, two electric hoists. Cooper and Abbot veins have been opened at No. 2 shaft, which will materially assist in increasing the output of this colliery in the future.

The condition of the colliery has been improved by a general cleaning up, white washing and painting of the buildings, on the outside, and the cleaning and ballasting of the roads on the inside.

DELAWARE AND HUDSON COMPANY

Plymouth No. 2 Colliery

Reopening Hillman vein, repairs to No. 1 shaft, concreting, etc., making branches, etc., at foot of No. 9 plane; electrical machinery for lighting this division, buildings, etc., two large boilers added to the present boiler plant, extension of boiler house Hillman vein improvements; pump room and tunnel; additions to the washery, fifty new mine cars.

Plymouth No. 3 Colliery

Tunnel from bottom to top split of Red Ash vein. Additional compressor with house additions, etc. Additional boilers; fifty new mine cars.

Plymouth No. 4 Colliery

Mountain plane in the outcrop, conveyor for fuel to boiler house; fifty new mine cars.

Plymouth No. 5

Fifty new mine cars; coal conveyor.

Boston Colliery

No. 4 plane, bottom to top split Red Ash; one additional compressor; compressor house, addition to boiler house; rope haulage and extension, 100 new mine cars; chain hoist from tunnel to foot of shaft.

New barn built in Cooper vein to take place of barn destroyed by squeeze of 1903 in 5 foot vein.

Flushing hole and crushers to crush refuse from breaker for flushing purposes installed.

Plymouth No. 4.—No. 10 plane Ross vein driven 150 feet.

Plymouth No. 5.—Rope hole drilled and 12½x15 inch engines installed for No. 5 plane, top Red Ash vein, which has been extended 370 feet.

Boston.—No. 4 rock plane from bottom to top Red Ash completed 400 feet and extended in coal 200 feet; No. 4 tunnel Ross vein driven 132 feet; No. 10 plane, top Red Ash, extended 600 feet; No. 9 plane, top Red Ash, extended 400 feet; No. 11 plane, Bennett vein, has been opened from the old No. 1 tunnel level, 900 feet; foot of shaft Red Ash vein retimbered and equipped with light car haul.

Mules

March 21, Nottingham, No. 8 East Red Ash vein, Stanley Dudeck, miner was fatally injured. The driver was pulling a car out of the victim's chamber. The mule balked and would not pull the car. Dudeck came forward and struck the mule on the hips with a piece of iron. The mule kicked him. Dudeck came forward again and struck the mule a second time with the iron. The mule kicked him again, this time in the stomach. He died the same evening at his home from the result of his injuries.

Miscellaneous, Inside

February 18, Nottingham, 11 West, Red Ash vein, Thomas McDaniels, inside conductor, was fatally injured. He was helping to charge the air locomotive when the coupling on the charging station came loose, permitting the escaping air to strike him. He died from the result of his injuries in the City Hospital, March 11.

December 28, Lance, Bennett vein, David Jones, laborer, was fatally injured. He was at the foot of the shaft, entering the cage to come to the surface, when a small piece of rock fell down the shaft and struck him on the head and crushed his skull at the base of the brain. He died a few minutes afterward.

Miscellaneous, Outside

June 29, Plymouth, No. 3, John Sweeney, slate picker, was electrocuted. He was playing about the breaker before starting time, and got hold of a steam pipe that was charged with electricity. It is supposed that the electric wire came in contact with the feed wire of the Traction Company, caused by the storm the night previous.

CONDITION OF COLLIERIES AND IMPROVEMENTS

DELAWARE AND HUDSON COMPANY

Plymouth No. 2

No. 11 Plane driven through rock from Stanton to Hillman vein 230 feet.

No. 10 plane extended 300 feet and finished.

No. 7 Slope, Bottom, Red Ash vein, extended 170 feet.

No. 6 Slope, Stanton vein, extended 475 feet.

Condition of colliery is good.

Plymouth No. 3

No. 8 Plane, Lance vein, driven 300 feet.

New steel tower erected over main hoisting shaft to take place of frame structure.

Condition of colliery is good.

Plymouth No. 4

No. 8 Plane, Top Split, Red Ash vein, extended 250 feet.

Condition of colliery is good.

Plymouth No. 5

No. 6 Slush hole continued from Bennett to Bottom Red Ash vein, a distance of 225 feet.

New steel tower erected over main shaft to take place of frame structure.

Condition of colliery is good.

No. 2 shaft.—Concrete for 79 feet from surface to rock, also re-timbered 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" x 36" pump is being installed.

New brick blacksmith and carpenter shop completed; new brick oil house and hospital and new brick warehouse completed.

Fifty foot addition to stable.

Addition of 300 H. P ; B. and W. boilers completed for washery.

Electric haulage is now in service between the Red Ash vein and foot of slope.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Woodward Colliery.—The work of sinking Woodward No. 3 Shaft on the Kingston flats has progressed to a depth of 450 feet. The shaft will be completed during this year to the Baltimore vein.

The rock tunnels have been driven from the Cooper to Five Foot vein for development.

The work of installing the sub-station mentioned in last year's report has been completed, but it is not yet in operation.

The No. 2 Shaft hoisting engines have been equipped with new drums and clutch arrangement; also steam brake and reverse.

The three slide valve breaker engines have been replaced with three compound Corliss valve engines, in order to economize in the consumption of steam with very good results.

Four new concrete and steel air bridges have been built during the year.

Avondale.—The work of installing an inside sub-station mentioned in last year's report is now completed and is in operation and running order.

The Ross shaft has been abandoned as a hoistway and will be used hereafter as an air shaft only.

One concrete and steel air bridge has been erected on 4½ East lift, No. 2 Slope, Red Ash vein.

A rock tunnel was driven from Ross vein to surface for second opening to Ross and Red Ash veins.

DELAWARE AND HUDSON COMPANY

Plymouth No. 2 Colliery.—Rope hole, 93 feet deep, drilled for No. 7 plane.

Air shaft to Lance vein sunk 40 feet.

No. 9 slope, Top Ash vein, driven 340 feet.

Plymouth No. 3 Colliery.—Air shaft to Lance vein sunk 40 feet deep.

No. 9 plane, Station vein, extended 450 feet.

Plymouth No. 5 Colliery.—Slush hole for ashes drilled 448 feet deep.

No. 2 slope Cooper vein, rope hole drilled 177 feet deep.

Rock slope from Bennett to Cooper vein completed 350 feet long.

Four Emery slate pickers installed in breaker.

Boston Colliery.—New plane No. 6 driven from Boston to Plymouth No. 5 in Bottom Red Ash 4,200 feet long, to take Boston coal to Plymouth No. 5 breaker. Rope hole 446 feet deep drilled, and pair of 22 x 48 inch Dickson engines installed. Boston breaker has been abandoned.

"An era in the history of mining anthracite in the Wyoming coal field has been inaugurated by the success of the Dundee Coal Company in reaching a superior vein of eleven feet in thickness at a depth of nearly 800 feet below the surface.

From a distance we have watched the progress of this shaft with anxious eyes, and we are sure that the pleasure to us of their success can very little be less than to the members of the company. Much credit has been thrown on our coal field by the partial and unsuccessful exploration for coal in Hanover and Newport. Borings have been abandoned at a depth of three or four hundred feet, leaving doubt about the existence of coal, in the minds of strangers, and, indeed, in the minds of some of the less sanguine of our own citizens.

The Dundee Coal Company, composed principally of our own citizens, resolved to sink its shaft to a depth of 1,000 feet if coal could not sooner be obtained. The largest vein cut had been but four feet, with many smaller ones. Still, without hesitation, yard after yard was cut. Mr. F. Koerner, an intelligent and energetic man, had charge of the work, which progressed as rapidly as the hard rock would permit, until 780 feet had been passed. Then indications of coal appeared and an auger was put down three feet to a small eight-inch seam of slate below which was a vein of fully eight feet of beautiful coal. To the bottom of the vein is 792 feet, and to provide for the dropping of the water from above the shaft was sunk a few feet deeper, probably 800 feet in all."

The story is continued with a narrative of the personal experiences of the editor in a descent of the shaft. A large stream of water entered at a depth of 250 feet, but was cared for by pumps. The editor mined a few specimens of coal at the bottom with illumination furnished by a few gas jets pouring forth from the vein itself. He says, in his story, that the vein was supposed to be the Mills vein, found at Nanticoke, and that other veins of greater thickness were believed to be underlying it. This belief was well founded, for the territory in which this vein was located is now considered the richest in the Wyoming coal field, and the lower veins are found at a depth of from 1,800 to 2,000 feet. The ancient chronicler also tells of the gas found in the vein, for it was the presence of this gas in large quantities and the lack of knowledge of proper ventilating methods in those days that caused the subsequent abandonment of the mine.

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance No. 11 Colliery, Inside.—Tunnel, Cooper to Five Foot, No. 1 Slope, 5th West.

Nottingham No. 15 Colliery, Outside.—Corliss breaker engine.

Reynolds No. 16 Colliery, Inside.—Rock plane, Ross to Ross, No. 4 tunnel East.

DELAWARE AND HUDSON COMPANY

Plymouth Nos. 1 and 2 Colliery.—A return airway was driven from No. 14 plane, Abbott vein to No. 1 shaft.

An air shaft was sunk 55 feet from surface to Lance vein workings and 300 feet of return airway was driven in vein.

A 50,000 gallon water tank was erected and pipe connections made for boiler supply.

Plymouth No. 3 Colliery.—Extensive repairs were made to breaker and the timbering in main shaft was replaced by concrete from top to bottom. A new 8-inch rope hole was drilled 425 feet from surface for No. 6 plane, Red Ash vein.

Plymouth No. 5 Colliery.—No. 7 plane, Bennett vein, was driven 1,200 feet and an inch rope bore hole was sunk 290 feet from surface.

No. 3 plane, Bennett vein, was driven 250 feet.

Boston.—No. 14 plane was driven from the Boston Split Red Ash 250 feet through rock to the Top Red Ash and 600 feet in the latter vein.

No. 15 plane, Bottom Red Ash vein, was driven 1,100 feet.

The Boston breaker was torn down and the coal is now being prepared at No. 5 breaker.

PARRISH COAL COMPANY

Buttonwood and Parrish Collieries.—Safety conditions, ventilation and drainage, good.

PLYMOUTH COAL COMPANY

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

GEORGE F. LEE COAL COMPANY

Chauncey Colliery.—Safety conditions and drainage good. Ventilation fair.

WEST NANTICOKE COAL COMPANY

West Nanticoke Colliery.—New opening, just opening up from surface.

BRIGHT COAL COMPANY

Hillside Colliery.—Safety conditions and ventilation good. Drainage fair.

IMPROVEMENTS

KINGSTON COAL COMPANY

Kingston No. 2 Colliery.—Inside: A tunnel was driven from Cooper vein to Lance vein for haulage and second opening. Two 2-inch drainage holes were bored from Cooper vein to Bennett vein. Two electric hoists were installed in Bennett vein. A new 6-inch hole was completed from the surface to Red Ash vein, a distance of 550 feet, through which electric wires are conducted, the old ones having been removed from the shaft.

At No. 3 shaft a 15-degree rock plane was completed from Ross vein through the Eleven Foot vein to Bennett vein, making a second opening between Nos. 1 and 3 shafts.

In the slope and tunnel a new manway and muleway completed from Eleven Foot vein to the surface, and a new second opening completed from Eleven Foot vein to Bennett vein on the west side.

Outside: Rebuilt empty car trestle at head of No. 3 shaft extended No. 2 shaft boiler room to install 600 horse power additional B. and W. boilers. New blast fan has been purchased. New 10-inch steam line constructed from boiler house to No. 3 shaft and fan engines.

Gaylord Colliery.—An 18 by 30 by 27½ by 24 inch Ingersoll-Rand Corliss, valve two-stage air compressor was installed.

DELAWARE AND HUDSON COMPANY

Plymouth No. 5 Colliery.—At Boston Red Ash, No. 17 plane air return from No. 13 plane 7 by 12 by 132 feet, 18 degree pitch, and work on concrete stables completed.

Plymouth No. 2 Colliery.—Two 24-inch bore holes drilled from surface to Bennett vein, 640 feet deep. Concrete reinforcements to pumping rooms Nos. 1 and 2 in Bennett vein. Tunnel, 7 by 12 feet, 422 feet long, driven from No. 7 plane in "G" vein to top of Plymouth No. 5 Shaft. Established Mine Rescue Station for Plymouth Division, equipped with Draeger Apparatus and other appliances.

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.

BRIGHT COAL COMPANY

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

IMPROVEMENTS

LEHIGH AND WILKES-BARRE COAL COMPANY

Nottingham No. 15 Colliery.—Inside: Completed remodeling of pumping plants on No. 1 slope.

Lance No. 11 Colliery.—Inside: Completed concreting of shaft walls and installed fire doors at top of hoisting shaft.

Outside:—Completed power house.

Buttonwood No. 22 Colliery.—Completed No. 1 tunnel from Stanton to Baltimore vein; also tunnels from Hillman to No. 1 tunnel and No. 1 tunnel to Stanton, for haulage. Completed concrete walls at top of hoisting shaft.

Inman No. 21 Colliery.—Inside: Completed tunnels on both sides of Baltimore shaft to Hillman vein for landing.

DELAWARE AND HUDSON COMPANY

Plymouth No. 3 Colliery.—Completed outlet of G or Stanton vein to Plymouth No. 3 shaft, 7 by 12 by 80 feet, on 14 degree pitch.

Completed tunnel 7 by 12 by 280 feet, light car road, to G or Stanton vein; tunnel, 7 by 12 by 320 feet, light car road, to Cooper vein; plane, 7 by 12 by 60 feet, on 18 degree pitch, for car haul; also car haul, 60 feet, on 18 degree pitch.

Plymouth No. 5 Colliery.—Completed tunnel 7 by 12 by 400 feet, G or Stanton vein, to Plymouth No. 5 shaft; also tunnel 7 by 12 by 90 feet, G or Stanton vein, through fault.

Concreted car haul, G or Stanton vein, 145 feet on 8 degree pitch.

Installed electric hoist on No. 2 plane, Cooper vein, operated by Flory 150 H. P. engine.

Installed 16 by 20 inch Flory steam hoist engine to operate No. 13 plane in Red Ash, in Boston section.

Completed pump room in Red Ash vein 11 by 18 by 38 feet, of concrete and steel; also bore hole, 16 inches by 325 feet, Red Ash vein to surface for pumping.

Plymouth No. 2 Colliery.—Completed air return and outlet from Snake Island to surface 7 by 16 by 170 feet long; air return Abbott to Snake Island 7 by 12 by 130 feet on 35 degree pitch; air return Lance to Abbott 7 by 12 by 130 feet on 30 degree pitch; also tunnel 7 by 12 by 300 feet G or Stanton vein to Plymouth No. 2 shaft.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Woodard Colliery.—Are installing a 20-foot multi-blade ventilating fan on No. 2 shaft, a duplicate of the one installed in 1912.

Driving rock tunnels from Cooper to Lance vein for development and ventilation.

MINE FIRE AT THE BOSTON MINE

The fire at the Boston mine, **Plymouth No. 5 Colliery**, of the Delaware and Hudson Company, May 10, was the third one to occur within a month. The first was at the Pancoast, April 7, and the second at the Gipsy Grove breaker, April 27.

The number of lives lost in the Boston mine was five. Fortunately the fire occurred on the night shift or the loss of life would probably have been much greater.

In the verdict of the coroner's jury it is said that "the fire was started by some person or persons unknown to the jury and that it was of incendiary origin." If the evidence submitted warranted this verdict the authorities of Luzerne county, through the district attorney and county detective, should spare no effort or expense to find the guilty person and see that proper punishment is inflicted, as a fire of this kind may be started in almost any mine and may endanger the lives of hundreds of employes. I am not aware that any effort has been made or is being made by the authorities of Luzerne county or by the coal company to apprehend the guilty person or persons, but I hope that some effort of that kind is being made.

To my personal knowledge this is the first fire of incendiary origin inside of a coal mine, but several such fires have occurred on the surface.

According to the report of Inspector D. T. Davis, the fire occurred at the mouth of man-way on Red Ash Vein Crop. "About half a dozen sets of hard wood timber, especially selected and suitably prepared, bark peeled, with lagging composed of three inch plank on top and sides over-lying the timber were used in order to prevent the clay from rushing in and obstructing the passage-way. Beyond and in close proximity to this a portion of the man-way was driven through the rock on an angle of approximately twenty degrees, which penetrated the vein. The volume of air entering through this opening, which was the in-take, was from 40,000 to 50,000 cubic feet per minute. The velocity of the current was so great that sparks were conveyed to the coal and the ignition was almost instantaneous. The products of combustion, both complete and incomplete, producing carbon monoxide and carbon dioxide gases, were conveyed with the air and circulated to all portions of 13 Vein workings. This portion of the mine is non-gaseous, but, in order to further safeguard the lives of the persons employed therein, a fire boss was on duty constantly. The east and west side of this plane was ventilated by two separate currents. Those employed on the east side escaped with much difficulty as the smoke entered the workings in such a dense volume as to make it utterly impossible for them to see in what direction they were going. They were compelled to grope and feel their way until No. 8 tunnel, Top split of Red Ash Vein, had been reached and an independent current of air from a portion of the Upper Split was encountered. The persons employed on the west side of 13 plane were less fortunate, as their bodies were found in the face of Two West airway, at which

place they were engaged at work. It seems that according to the condition of the bodies, for their dinner pails were found by their sides, they must have made a great effort to reach a place of safety, but not being able to do so on account of the density of the smoke, retreated to the face of their working place, at which place their bodies were discovered.

The bodies of the driver and door boy were found on the plane, at the entrance to a lift on the east side. The officials of the mine did all in their power to rescue the victims. Several persons were engaged in making an effort to smother the fire and others were inside the mine changing the course of the current so as to send fresh air to the section of the mine to where the victims were employed.

The workings of 13 plane are so arranged that the ventilating fan, located at the main hoist shaft, about a mile from the surface entrance to the man-way, controls the currents circulating through the mine.

Doors had been erected and thrown back, so that in case of emergency they could be immediately closed with the desired effect of reversing the current in the interior of the mine. The officials and miners were greatly surprised that the fire should do so much damage in a place that was least expected, and at such a peculiar time, but the smoke, instead of gradually becoming more dense, entered the mine in great volumes, overcoming the employes who had perfect knowledge of the means of ingress and egress of this portion of the mine. In order to ascertain in what manner the fire originated, I instructed D. W. Dodson, Coroner of Luzerne County, to hold an inquest."

The following verdict was rendered by the jury:

"That the said William Anglanicz came to his death on the 10th day of May, 1911, at the Boston Colliery, D. & H. Coal Company, from being suffocated by smoke in said colliery. John Russbuski, Jacob Kurrilla, John Malast and George Fender all lost their lives at the same time and place, and from the same cause. William Anglanicz was a laborer. The evidence shows that all these deceased men were working on the night shift, and that about ten o'clock in the evening a fire broke out at the opening of the man-way, and the smoke from this fire in great quantities penetrated the part of the mine in which they were working and suffocated them almost immediately. Six men working in another part of the mine were able to work their way out through one of the other openings. The evidence shows that the said mine had three avenues of escape. The manway, through which the men made their way into the mine, has several sets of timber at the opening, and it was at this point that the fire originated. This manway also served as an intake for air. Fifty thousand cubic feet of air passed in per minute. The jury visited the mine in order to inspect it, and from this inspection, as well as from the evidence, we find that the fire was started by some person or persons unknown to the jury, and that it was of incendiary

origin. We believe that all inflammable material whatsoever should be eliminated from the mines wherever and whenever it is possible to do so.

(Signed)

Thomas J. Hatton,
John J. Boney,
James Williams,
Thomas D. Lloyd,
Wm. I. Williams,
David Phillips."

The mine fire at the Pancoast mine created such an excitement among the mining population that the legislature passed an act which I have no doubt will prevent the recurrence of such catastrophes. The act reads as follows:

"No. 788

AN ACT

To safeguard life in the coal mines of the Commonwealth of Pennsylvania, and to protect and preserve the property connected therewith, by providing that all inside buildings shall be constructed of incombustible material; and providing penalties for failure to comply with the terms of this act, and making a violation thereof by mine superintendents a misdemeanor.

Section 1. Be it enacted, &c., That within six months after the approval of this act, all buildings inside of any coal mine in Pennsylvania, including engine houses, pump houses, stables, et cetera, shall be constructed of incombustible material, approved in writing by the Chief of the Department of Mines: Provided, however, That the time may be extended by the Chief of the Department of Mines, for a period not exceeding six months, upon sufficient cause shown by any person, firm or corporation, of inability to comply with the provisions of section one as to the time therein specified.

Section 2. Any company failing to comply with section one of this act shall be subject to a penalty of five hundred dollars, to be recoverable by the Commonwealth as debts of like amount are now by law recoverable. Any superintendent of a coal mine failing to comply with section one of this act shall be deemed guilty of a misdemeanor, and upon conviction shall be sentenced to pay a fine of one hundred dollars, or undergo imprisonment in the county jail for a period of ten days, or both, at the discretion of the court.

Section 3. The fines collected for violation of this act shall be paid to the Department of Mines, and the Department of Mines shall pay the same into the Treasury of the Commonwealth.

Section 4. All acts or parts of acts inconsistent with the provisions of this act be and the same are hereby repealed.

Approved—The 15th day of June, A. D., 1911.

JOHN K. TENER."

It is the hope of the Department that on the 15th day of June, 1912, when the period of one year from the date of approval of the act shall have expired, the stables, pump-houses, engine-houses and all other buildings in the coal mines of this Commonwealth will be made of incombustible material.

Plymouth No. 3 Colliery.—Rock plane was driven from Stanton vein to Hillman vein, a distance of 300 feet.

Plymouth No. 5 Colliery.—The breaker has been entirely re-modeled. In the Boston section, a tunnel 80 feet in length was driven from the Bennett vein to the Cooper vein.

KINGSTON COAL COMPANY

Kingston No. 2 Colliery.—Inside: In No. 2 shaft, completed two short tunnels from Cooper vein to Bennett vein for a second opening; also two short tunnels from Cooper vein to Lance vein for a second opening. In the old slope, a new traveling way for men and mules was completed from Red Ash lower level to top lift.

Outside: Installed a 10,000 gallon water tank. Completed two concrete powder houses.

MINE FOREMEN'S EXAMINATIONS

The annual examination of applicants for certificates of qualification as mine foremen and assistant mine foremen was held in Plymouth, June 6 and 7. The Board of Examiners was composed of David T. Davis, Mine Inspector, Wilkes-Barre; H. G. Davis, Superintendent, Kingston; George W. Raub, Miner, and Lewis R. Thomas, Miner, Plymouth.

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

MINE FOREMEN

Nathan W. Bittenbender, Frank Coggins, Elijah B. Dobson, Ezra M. Griffith, William B. Jones, Price Lloyd, Arthur Williams, Plymouth; James J. Duffy, Kingston; William C. Thomas, Edwardsville.

ASSISTANT MINE FOREMEN

George Barney, William J. Davis, Walter Peter Dajnowski, Richard Edwards, Fred B. Hick, Evan Hopkins, Samuel C. Heller, Howell T. Jenkins, Ignaz Kosmela, Joseph Leedock, Frank Munday, James H. Morgan, Felix Pohola, John B. Rees, William Richards, Joseph Stukowski, Frank Sobashinski, Walter Symons, Cornelius Shovlin, Joseph R. Thomas, Joseph Turek, Isaac J. Thomas, Thomas Taylor, Frank Walters, Martin Zola, Plymouth; Thomas Brislin, West Nanticoke; Alfred M. Clark, Alfred Jones, Stephen M. Lodwick, Griffith Roberts, Bert Smith, Albert G. Wilczak, Edwardsville; Evan J. Evans, Forty Fort; Michael Farrell, William Meyers, Larksville; John Powell, David T. Morgan, Kingston.

CONDITION OF COLLIERIES

DELAWARE AND HUDSON COMPANY

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

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

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

LEHIGH AND WILKES-BARRE COAL COMPANY

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

KINGSTON COAL COMPANY

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

PLYMOUTH RED ASH COAL COMPANY

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

SHAWNEE COAL COMPANY

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

IMPROVEMENTS

DELAWARE AND HUDSON COMPANY

Plymouth No. 3 Colliery.—Completed a tunnel and return airway, 150 feet long, through fault in the Stanton vein. The shaft landing in the Five Foot bed was secured by concrete walls and steel beams.

On December 2, 1916, the breaker was completely destroyed by fire, and the coal from this opening is being prepared at **Plymouth No. 5** breaker.

In No. 3 shaft, a tunnel 150 feet long and a return airway 40 feet long were completed from the Top Red Ash to Ross vein. A tunnel from the Stanton to the Five Foot bed was driven 200 feet.

Plymouth No. 5 Colliery.—A tunnel 290 feet long and a return airway 80 feet long were driven from the Bottom to the Top Red Ash. Four tunnels, averaging 120 feet in length, were driven from the Top Red Ash to the Three Foot bed.

Installed a 2,000 G. P. M. pump to pump from Bottom Red Ash to surface.

The mouth of No. 1 tunnel was secured by concrete walls and steel beams.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Woodward Colliery.—Completed a rock tunnel for haulage from the Lance to the Five Foot vein; distance 654 feet. Ventilation tun-

CONDITION OF COLLIERIES

DELAWARE AND HUDSON COMPANY

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

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

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

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance No. 11 and Nottingham No. 15 Collieries.—Ventilation, drainage and condition as to safety, good.

KINGSTON COAL COMPANY

Kingston No. 2 and Gaylord Collieries.—Ventilation, drainage and condition as to safety, good.

PLYMOUTH RED ASH COAL COMPANY

Red Ash Colliery.—Ventilation, drainage and condition as to safety, good.

SHAWNEE COAL COMPANY

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

IMPROVEMENTS

DELAWARE AND HUDSON COMPANY

Plymouth No. 5 Colliery.—At Plymouth No. 2 completed a slope from surface to Primrose bed, a distance of 160 feet, and an air shaft, 42 feet deep, from the surface.

Plymouth No. 3.—Completed No. 20 tunnel, Stanton to Five Foot vein, a distance of 600 feet; No. 20 tunnel, Five Foot to Cooper vein, a distance of 450 feet, and a slope from the surface to Snake Island bed, 140 feet long.

Plymouth No. 4.—Completed rock plane, Top Red Ash to Ross vein, and an air return Top Red Ash to Ross bed.

In the Boston section completed No. 14 tunnel, Top Red Ash to Bottom Ross, a distance of 250 feet, and an air return from Top Red Ash to Ross vein, a distance of 60 feet.

All coal in the Plymouth Division is prepared at Plymouth No. 5 breaker since the destruction of Plymouth No. 3 breaker by fire in December 1916.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Woodward Colliery.—The entire mine was thoroughly sectionalized and each section foreman had a concrete building erected in his respective section, equipped with an electric heater and telephone so that he can give his entire time to care and direction of his section.

CONDITION OF COLLIERIES

HUDSON COAL COMPANY

Plymouth No. 5 Colliery.—Condition as to safety, ventilation and drainage, good.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Woodward Colliery.—Condition as to safety, ventilation and drainage, good.

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance No. 11 and Nottingham No. 15 Collieries.—Ventilation, drainage and condition as to safety, good.

KINGSTON COAL COMPANY

Kingston No. 2 and Gaylord Collieries.—Ventilation, drainage and condition as to safety, good.

PLYMOUTH RED ASH COAL COMPANY

Plymouth Red Ash Colliery.—Ventilation, drainage and condition as to safety, good.

SHAWNEE COAL COMPANY

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

IMPROVEMENTS

HUDSON COAL COMPANY

Plymouth No. 5 Colliery.—Remodeled the breaker. At Plymouth No. 3, rock plane was completed from Top Red Ash to Ross bed, a return airway 39 feet long, and tunnel from Five Foot to Stanton vein, 625 feet long. At Plymouth No. 4, a rock plane was driven from Top Red Ash to the Top Ross vein, 500 feet long. In the Boston section, No. 8 tunnel was extended to Top Split of Ross bed, and return airway was driven. Also rock plane from Top Split of Red Ash to Bottom Split of Ross bed was completed, and return airway was driven 54 feet long.

LEHIGH AND WILKES-BARRE COAL COMPANY

Lance No. 11 Colliery.—Completed No. 22 plane from No. 15 tunnel east, Stanton to Kidney vein; No. 21 plane from No. 14 tunnel east, Hillman to Kidney vein; No. 9 slope Hillman from No. 14 tunnel east to basin; No. 11 slope, Stanton, driven to the south line of No. 20 plane.

Nottingham No. 15 Colliery.—Installed a 75-hp. electric hoist at Nos. 1 and 6 slopes.