

in letting down persons or material, whereby the engineer becomes accustomed to the use of his brake. However, Mr. Preedhoe, the master machinist under the Delaware, Lackawanna and Western Company, on this line, is entitled to credit for the manner in which he built his brakes, as they were about the third good brakes built in the district, and the first of this kind.

Ventilation.—The power used to cause a circulation in this mine, since the wood work was rebuilt, is a fan 12 feet in diameter, sheet iron casings, revolving disc and open periphery which exhausts from the mine about 38,000 or 40,000 cubic feet of air per minute. This air is conducted around the mine, in two different splits or currents, one east and one west; number of persons employed inside 138. There has not been much improvement made during last year, except in the building of all the stoppings, between the main air-ways and gangways with stone and mortar, which assists very much in keeping the air to the face of the mine, besides being much cheaper than the old wooden ones.

ELLIOT & Co's COLLIERY.

Hollenback Colliery.—This is a slope located on the plank road, Plainville township, and is sunk on the Hillman vein. It is a small colliery working around and stripping a fault to the dip of the old Hillman mines, besides mining a small tract of coal lying between them, and the mines of the Seneca Lake coal company, south of them.

Condition.—Nothing very important can be pointed out in the shape of improvements since my first visit.

There are but few persons employed inside. Ventilation at inlet, 14,500 cubic feet; at face of mine, 7,000; number of persons employed, 20 inside. No mechanical or artificial means used to assist ventilation.

Robert Pool, general superintendent; Thos. E. Morpeth, mining boss.

FRANKLIN COAL COMPANY'S MINES.

Brown's slope.—This slope is located a short distance south of Wilkesbarre, and is opened on the Baltimore vein.

Condition, &c.—The coal is hoisted to an old water level gangway. It is then brought to the surface through a tunnel. This mine has been idle a long time this year. The men are not allowed to travel the slope, there being a traveling road for that purpose. The mine is tolerably safe. They have some very poor roof, but it is generally well timbered. Otherwise it is about the same as when the last report was made.

Ventilation.—It is produced by having a small furnace, which moves about 13,620 cubic feet of air per minute at outlet; at face of mine, 12,350 cubic feet; number of persons employed inside, 75.

A new tunnel has been driven from the water level gangway into the Red Ash vein, from which they may be able to mine some coal in 1873.

R. R. Morgan, general superintendent; Wm. Thomas, assistant superintendent; Samuel Thomas, mining boss.

Old slope.—This slope is located a short distance east of the Brown's slope, on the same vein and nearly adjoining. There is also an underground slope to this mine. This mine is tolerably safe, there being but a small amount of gas generated, and there is a reasonably good current of fresh air circulated through the whole mine. Power used to create circulation is a fan 12 feet in diameter, which discharges about 30,000 cubic feet of air per minute. Number of persons employed inside, 93.

R. R. Morgan, general superintendent; Wm. Thomas, assistant superintendent; John D. Hughes, mining boss.

Sugar Notch Shaft.—No. 1 carriage dropped, first trial, 6 inches; second trial, 4 inches; third trial, 5 inches. No. 2 carriage dropped, first trial, 7 inches; second trial, 5 inches; third trial, $4\frac{1}{2}$ inches.

Empire Shaft.—No. 1 carriage dropped, first trial, $1\frac{1}{4}$ inches; second trial, $1\frac{1}{8}$ inches; third trial, $1\frac{1}{4}$ inches. No. 2 carriage dropped, first trial, $1\frac{1}{2}$ inches; second trial, $1\frac{1}{4}$ inches; third trial, $1\frac{1}{2}$ inches.

Diamond Shaft.—No. 1 carriage dropped, first trial, 1 inch; second trial, $1\frac{1}{4}$ inches; third trial, $1\frac{1}{2}$ inches. No. 2 carriage dropped, first trial, $1\frac{1}{4}$ inches; second trial, $1\frac{1}{4}$ inches; third trial, $1\frac{1}{2}$ inches.

IMPROVEMENTS.

Among other improvements of importance that have been made during the year, quite a number of ventilating fans have been built, all in the most suitable places, according to the views of the parties erecting the same. Some were erected on the surface, others were erected under ground.

The Delaware and Hudson Canal Company had one fan 20' 0" dia, built at the Mill Creek colliery. This fan exhausts about 72,000 cubic feet of air per minute. Of this amount, 38,000 are from the Pine Ridge shaft workings, and 34,000 are being circulated through the Mill Creek slope workings, in addition to 106,000 cubic feet exhausted by another fan, making an aggregate quantity of 140,000 cubic feet of air per minute circulated through the workings of the Mill Creek slope. The current exhausted from the Pine Ridge shaft ventilates the workings north of a large fault lying between the workings of the two collieries. Besides the amount of 38,000 cubic feet of air caused to be circulated by the aforementioned new fan, there is another current circulated and exhausted by another fan 20' dia, located at the Pine Ridge shaft, averaging about 70,000 cubic feet, giving a total of 108,000 cubic feet of air per minute for the workings in the Pine Ridge shaft.

The Delaware, Lackawanna and Western Railroad Company had a fan erected at Jersey colliery, near Plymouth. This fan is similar in dimensions and construction to that at Avondale, being a short iron casing revolving disk, 12' 8" dia, with open periphery. Much better ventilation is had in said mine since the fan has been started.

The Wilkes Barre Coal and Iron Company has had the following fans built during the year, to wit: At the Diamond shaft a fan 15' 0" dia was built inside the shaft workings for the purpose of ventilating the workings in the new slope. This fan receives its fresh air from the hoisting shaft, which is some few hundred feet east of the point where the fan is located, and it discharges its foul air into a large air-way, conveying it to the main upcast leading to the surface. The main air-ways, both in the upcast and intake, are of large areas. This fan, when being driven about 75 revolutions per minute, exhausts 40,000 cubic feet of air.

At the *Sugar Notch colliery* a fan 15' 0" dia has been built inside the shaft workings to ventilate the workings of the new slope. It is built under similar circumstance to that at the Diamond shaft. Other things not being quite ready, the fan has not yet been started.

The Franklin Coal Company has had one fan 15' 0" dia erected to ventilate their new tunnel workings on the Red Ash vein. This is comparatively a new mine, and the fan having but very recently been built, has not yet had much trial; but there can be no doubt of its being just what is required.

Messrs. Chas. Leonard, assistant superintendent; Wm. M'Culloch, mining foreman; W. B. Hick, mining engineer, and Philip M'Gabe, mining boss.

Susquehanna Coal Co.'s No. 1 Shaft.—This shaft has been completed to the Hillman seam, where they are at present opening out preparatory to driving for the second opening, which is to be secured by a connection with the workings in the No. 2 slope on the same seam. Work was suspended early in December, to remain so until their permanent machinery be in working trim, which consists of a pair of first-motion hoisting engines, cylinders — inches diameter, stroke — feet, drum — feet diameter.

No. 2 Shaft, S. C. Co.—This shaft has been completed so far as sinking is concerned, and is ready for the erection of their permanent machinery and hoisting tackle, which is also to be of a most substantial character, on the first motion style. A second opening for this shaft will be made by connecting to No. 1 slope workings.

No. 3 Shaft, D. and H. C. Cos., near Plymouth.—This shaft, although its sinking has been completed, yet it is not in operation, not having made connection with the second opening shaft. They still have considerable rock to drive through to reach the foot of the second opening shaft.

Oak-wood Shaft, L. V. C. Co.—This shaft has been completed, except connecting their new fan and making proper arrangements to ventilate the proposed workings of Oak-wood and a part of those already opened out in the Prospect shaft. The connections between the aforementioned shafts and the shaft timbering have been completed, and the massive machinery, calculated to hoist the coals from this shaft, are in place, also a fan 30 feet diameter.

SHAFT SINKING TEMPORARILY DISCONTINUED.

The following named new shafts, owned by the Lehigh and Wilkesbarre Coal Company, sinking in 1874, have been discontinued during 1875, to wit: Hollenback, South Wilkesbarre and the Gaylord (or No. 14) shafts.

Franklin Coal Company's New Slope.—This slope has been driven out to the surface, through rock, from the head of an inside slope, to do away with the old upper slope, and by said change get their coals to the surface by the one hoisting, and at the same time land it on a level that will enable them to run the same to the head of their breaker instead of, as heretofore, by two inside slopes and an additional hoist at the breaker.

The company are also putting very substantial machinery in place at the abovenamed slope, being a pair of first motion engines, with cast iron drum of uniform diameter. Diameter of engine cylinders, 30 inches; stroke, 72 inches; diameter of drum, 12 feet; face of drum 15 feet, and will carry over one-half a mile of wire rope of the diameter rope calculated to be used upon the same. There being but one track in the said new slope, and the same is calculated to operate several lifts, hence the rope will necessarily be upon their drum altogether by the time the load reaches the landing. There has also been erected a fine brick boiler room, and nine new boilers put up, 34 inch diameter and 80 feet long, with room for 3 or 6 more in the building.

NEW SHAFTS AND DRIFTS.

Messrs. Broderick, Walters & Co. are opening out a very extensive concern, about two miles north-east of Kingston borough, by sinking two new shafts, driving and opening four new drifts, and erecting a very extensive breaker. The breaker is calculated to prepare the coals from the two shafts and a part of the coal from those drifts, or probably all at present, until

Prospect Shaft, L. V. C. Co.—This mine has had a second opening by connecting with the Oakwood shaft just sunk, which is intended to give a lawful second opening and an additional means for ventilating Prospect shaft, besides that it will be used as a separate and independent hoisting shaft. Depth, 600 feet, nearly.

D. & H. C. Co.'s No. 4 Shaft, Plymouth Mines.—This shaft, having been sunk from the Baltimore to the Red Ash seam, required a second opening, which was effected through sinking a new shaft west of the hoisting shaft, at the proper distance. The said new shaft is intended to be used for pumping and ventilation.

SHAFTS AT PRESENT WITHOUT SECOND OPENINGS.

- D. & H. C. Co.'s No. 3 Shaft, near Plymouth.*
- L. & W. B. C. Co.'s Hollenback Shaft, located in the city.*
- S. C. Co.'s Nos. 1 and 2 Shafts, East Nanticoke.*

BALTIMORE MINES FIRE.

The fire in the mines above named, which was described in my report for 1874, has not yet been extinguished, although confined within the barricade made of earth and clay, except that occasionally it breaks out, besides that the roof or covering, which is so thin and broken, falls in once in awhile. The force of persons that was required is now reduced to a very few men.

The steam from the boilers, mentioned in my last report as being forced into the fire, has been discontinued for some time.

EMPIRE FIRE.

It is not definitely known whether the fire in the above named mine, which was also described in my last report, is still burning or not. When last that the enclosure was penetrated the heat was so great in some parts, near the surface or crop of the seam, that it was considered advisable to close it up again, although it causes no other inconveniences than the expense of keeping a man or two to watch for fear of surface caves, which they had to guard against from the breaking out of the fire.

The coal that would have been brought to the shaft, being hoisted through No. 5 slope, has been done just as successfully through the new opening made west of the tunnel into No. 4 slope workings, and mining carried on just as extensive as prior to the fire.

STEAM BOILERS UNDER GROUND.

Nearly all the steam boilers located under ground in this district have, within the last few years, taken them out, and especially so since the great fires in the Empire and Baltimore mines. The boilers of Nos. 4 and 5 slopes, at the Empire mines, have been taken out, and a bore-hole 9 inches in diameter was put down with a diamond drill at No. 4, through which steam pipes were taken from boilers on the surface, and steam is conveyed from the surface to the No. 5 engines, the pipes being about fifteen hundred feet in length.

At Sugar Notch a hole has been put down preparatory to taking out boilers from said mine.

Franklin Coal Co.'s Old Slope.—The steam boilers that they have had inside of their mines for many years have this year been taken out.

Jersey Mine.—The steam boilers, located near the head of their inside slope, have been taken out about two or three years ago.

new double fan was erected to supersede their old furnace. The fans are seventeen and a half feet in diameter, and fastened on the same axis, about eight feet apart; a plan of which is kindly furnished for this report, which can be seen in connection with the report of tests of the fan.

The breaker formerly at Young's slope was removed and erected at the Conyngham shaft. It was completed by August 13, when they began shipping coal. When the colliery is fully opened they will be able to put out about seven hundred tons of coal per day. About twelve years have elapsed since ground was first broken to sink this shaft.

Susquehanna Coal Company.

A tunnel was driven in No. 1 slope, from the Red Ash seam to the Ross. Its length is four hundred and eighty-seven feet, and size seven by ten feet. The coal is thin, but of good quality. Another tunnel is in progress lower down on the dip, in No. 2 shaft, to cut the same vein. A slope is also in progress of sinking in this shaft, towards the basin. It is down, at this writing, four hundred and eighty feet from the gangway level, near the bottom of the shaft, on a varying grade of from seven to twelve degrees.

Kingston Coal Company.

This company's new shaft, at Kingston, is down to the Red Ash vein, and has cut, in all, five seams of good workable coal. The Red Ash, at the point cut, is six feet thick. A tunnel was driven in No. 1 shaft, from the Cooper to the Bennett seam, which is ten feet thick, and has opened a convenient section of coal of good quality. The tunnel is two hundred feet in length.

Gaylord Coal Company.

The Gaylord shaft is completed to the Red Ash vein, and has cut three veins hitherto not worked in this track, viz: Bennett, Ross, and Red Ash seams. They are now working to effect second openings, which will be accomplished in about three months. The shaft is forty-seven by twelve feet area, and five hundred and seventy-five feet in depth. There are two pairs of hoisting engines and four cages—all of the latest and most approved plans. The coal will be shipped through the old Gaylord breaker, and will eventually be able to ship about twelve hundred tons per day.

Franklin Coal Company.

In the Brown slope a new tunnel was driven from the Baltimore to the Red Ash vein, and a new plane was made in the former to let the coal down from the upper lifts.

W. G. Payne & Co.

In the East Boston mine a new tunnel was driven from the Bennett to the Cooper vein, which is one hundred and fifty feet in length, and fourteen by six feet area. The seam is six feet thick, and the coal of excellent quality.

full of fire-damp, and it was explosive. Through the extraordinary care of the managers and workingmen employed to remove the danger no accident occurred, and the usual safe condition of the mines was finally restored.

On the 27th day of June, again, the Baltimore and Conyngham mines experienced another trouble which complicated the condition of both to a certain extent. During an unusually heavy rain storm a dam located on surface above the Baltimore mines gave way, and the water broke into the workings through an old cave-hole near the outcrop of the seam. A large stream of water poured into the mine for nearly two days, carrying with it thousands of tons of mud, stone, and sand. Two small houses were also washed in, with all they contained, the inhabitants barely escaping. The water was finally stopped by throwing large trees, stones, and bales of hay into the hole. Fortunately this happened early in the morning, when only a few persons happened to be in the mines, and they all escaped without injury. The lowest point in the workings was at the bottom of the Conyngham shaft, and the water filled this shaft to a height of three hundred and forty feet. The mud and débris of all descriptions filled the airways and gang-ways of the Baltimore slope above the level of the water, and prevented the air from traveling its usual courses; consequently all the workings accumulated fire-damp. The cars and roads were torn up and washed down by the rushing streams of water to a heap of rubbish at the lowest points in the workings, making the work of restoring order very tedious, expensive, and dangerous.

By the end of the year, through strenuous efforts, nearly all the useful passages were cleaned out, and the ventilation circulated so as to clear out the fire-damp. But the second opening of the Conyngham was permanently destroyed, and a new one had to be effected through solid coal to another point in the Baltimore slope workings. This work is in progress, but is not yet completed, and evidently two or three months will elapse before it can be effected. Much praise is due to the bosses of these mines and to the workingmen for the care and intelligence exercised in the trying, dangerous situations encountered while restoring order in these mines and removing the dangerous gases. During a year of extraordinary dangers, no accidents occurred to any of the persons employed at this perilous work.

During the latter part of March the workings of the old slope of **Franklin** mines caved and filled with fire-damp, and they have not been able to mine much coal from there since. The sump-pillar in the upper lift was somewhat damaged by the crush, letting the water run to the lowest lift, beyond reach of the pumps; but they have succeeded in removing both water and some of the fire-damp, and they are now at work re-opening the lowest lift, where nearly all the unmined coal is left, and from which it can again be mined. By exercising care and watchfulness, they succeeded in accomplishing the work without any accidents to the workingmen, and they are at present comparatively past their peril.

The Kingston Coal Company.

The No. 4 shaft of this company was completed upon reaching the Red Ash seam at a depth of six hundred and sixteen feet. Its size is 30'×12'. This opens a very large tract of convenient coal.

The Gaylord Coal Company.

At the Gaylord colliery a tunnel is in progress from the Ross to the Red Ash seam. Its sectional area is 7'×10', and its length, at present, is six hundred and fifty feet. This is intended to work the coal above the level of the bottom of the Gaylord slope.

A. J. Davis.

At the Warrior Run colliery a tunnel was driven from the C to the D vein. Its sectional area is eighty-five square feet, and its length one hundred and ten feet. The seam of coal was found eleven feet thick, and of good quality.

The Franklin Coal Company.

This company has started to sink a new slope, from the surface diagonally through the measures, to cut and work the Red Ash seam. Its sectional area is one hundred and sixty feet square, grade thirty degrees, and it was driven to a depth of one hundred feet at the end of the year.

W. G. Payne & Co.

At the East Boston mines of this company the shafts are being sunk or extended from the Bennett to the Ross vein. They had not struck the expected point at the close of the year, but they were approaching it closely. The blasting-hole in the air-shaft was thought to have penetrated the coal seam.

The Red Ash Coal Company.

A new tunnel is being driven from surface at the outcrop of the Baltimore seam, and is intended to drain and mine the coal lying above that level, and between that and the Red Ash slope, of both the Ross and Red Ash veins. It was driven a distance of three hundred and seven feet at the end of the year, and is expected to be finished sometime in 1884. This will open a wide extent of very convenient territory and desirable coal.

The West End Coal Company.

This company is opening a new mine and building a new breaker about three miles east of their West End colliery, in Conyngham township. It is to be named East End colliery. The breaker is expected to be ready in March, 1884. The vein is opened by two tunnels—one on each side of the basin—and they will mine and ship coal as soon as the breaker is completed.

The Delaware and Hudson Canal Company.

This company is sinking two new shafts in Plains township, near the Baltimore mines, for the purpose of mining the Red Ash seam. The main

General Condition of the Mines.

Eighty-four openings, including the new shafts and slopes in progress of sinking, were in operation in this district during the year 1884. All of these except eleven produced more or less coal for the market. The underground workings are maintained in about the same condition as they were upon my previous report for the year 1883, excepting that a marked improvement was made in some of the mines in which the ventilation was not then satisfactory. A fan was erected in the West End mine, which improved the ventilation very effectively. The workings are now kept clear of smoke, and are much healthier for the workmen therein. Since the present proprietors began operating the Black Diamond colliery, in Luzerne borough, the colliery has been very effectively improved, and a new shaft is now being sunk upon which a new fan is to be erected to produce a more effective ventilation. I have complained frequently of the ventilation of this mine, but under the old management the required improvements were continually deferred. Now the improvements in progress will shortly bring the mine to a satisfactory condition.

The Conyngham and Baltimore Slope mines, both of which were seriously damaged by inundation of water the latter part of 1883, have since been restored to their former order. The second openings, and all matters pertaining to the safety of the men employed therein, are satisfactory.

At the Warrior Run colliery the ventilation, for some time past, was rather small, but they have succeeded in increasing its volume to a small extent by enlarging the outlet air-passages. Now it is in a fair condition; still, the margin is small, and they will have to be watchful, or, as the workings advance, it may soon become inadequate again.

The air-ways in every mine, where practicable, should be made of sufficient area to have the cars follow the miners. The old system of wheeling the coal in a wheelbarrow should be abandoned; it is both laborious and expensive, and the miners very reluctantly drive the air-ways wider than is necessary to pass the wheelbarrow, where such system is in vogue. The inevitable consequences of having small air-ways is a small quantity of air for ventilation.

At the Old Slope **Franklin** colliery a marked increase of ventilation was effected by making a change in the construction of the outlets of the double fan, and also by enlarging the main air-ways in the mine. This mine is now in much safer and better condition generally than it was at the beginning of the year 1884. Other improvements are contemplated, which, if made, will still enhance the safety and producing capacity of this mine.

The mines of the large companies, those of the Lehigh Valley, Lehigh and Wilkes-Barre, Susquehanna Coal Companies, and Delaware and Hudson Canal Companies, are generally in good condition. I find, though, that even in the mines of these companies the ventilation is conducted through the faces of the workings better in the gaseous mines than in the ones producing no gas. The bosses of some of the mines in which no explosive gases

The Kingston Coal Company.

The No. 4 shaft, sunk by this company, reached the Red Ash seam at a depth of six hundred and sixteen feet. This opens a very wide extent of territory and is expected to produce a large supply of coal. The second opening will be effected by opening into the workings of the No. 3 shaft of the same company.

The Franklin Coal Company.

Important improvements are in progress at the Franklin colliery. A new slope is being driven down across the measures to cut the Ross and Red Ash seams, and it has reached a depth of six hundred and ninety-three feet on a grade of thirty-three degrees. Eventually, when the slope cuts the Red Ash, a new breaker will be erected, from which all the coal of this colliery will thereafter be shipped. The ventilation of the old slope mine was considerably improved last year by enlarging the air-ways and by some modifications in the construction of the fan.

W. G. Payne & Company.

The East Boston shafts of this company were extended to lower seams. The main shaft to the Red Ash, a depth of three hundred feet, and the air-shaft to the Ross seam, a depth of two hundred and thirty-four feet. This improvement opens a large area of good coal for this company. The size of the main shaft is 11'×22', and of the air-shaft 10'×18'.

Haddock & Steel.

A new air-shaft is in progress at the Black Diamond colliery of this company, and it has reached the Cooper seam at a depth of one hundred and fifty-two feet. Its sectional area is 12×12 feet. A tunnel was also driven on a rise of seventeen degrees from the Bennett to the Cooper seam, by which a large piece of good coal is intended to be mined from a point some distance below the old Cooper workings.

The Red Ash Coal Company.

The new tunnel reported last year as being driven from the surface to the Red Ash seam by this company is completed. It cuts through the Ross seam at a distance of nine hundred and nineteen feet, where the coal was found to be nine feet thick. The Red Ash was reached at a distance of eleven hundred and ninety-seven feet, and the coal is of excellent quality. This tunnel drains all the workings of this company, and relieves them of the cost of pumping water. The slope was extended to the level of the said tunnel, and opens a new lift, of about five hundred feet in length, in both seams.

Thomas Waddell.

The Raubville shaft was extended from the Bennett to the Ross seams, a depth of two hundred feet. They are now driving a second opening.

June, 1890. The coal production of both the Baltimore shafts Nos. 2 and 3, may be shipped through it, but it will be used chiefly to prepare and ship the coal of No 2 shaft. Its shipping capacity will be 1,000 tons per day.

The Lehigh Valley Coal Company is building a new breaker at the Franklin colliery. This will also be ready to prepare and ship coal early in 1890. Its capacity for cleaning and preparing coal will be about 1,500 tons per day.

SINKING HEAD FRAME WITH AUTOMATIC SAFETY GATES.

Through the kindness of Mr. W. A. Lathrop, superintendent of the Lehigh Valley Coal Company, a plan of the sinking head frame with automatic safety gates used when sinking the Franklin colliery air-shaft is presented in this report. It is the best device yet seen by the writer to protect the sinkers at the bottom of a sinking shaft from material that may fall on tipping the bucket. By reference to the drawing it may be plainly seen that while the bucket is down the shaft the gates or doors which are applied to close the top of the shaft are wide open, but as soon as the guiding appliances on one side of the crosshead enters between the arms of the levers attached to the doors by chains, the doors close and remain closed until the bucket is dumped and lowered again a distance of about four feet. Then the doors open for the bucket to pass down through. The two pulleys placed at the top and bottom crosspieces of the crosshead to prevent it from catching in the rope is also a very good device. In the event of the crosshead twisting it cannot bind on the rope. It has been in use while sinking the air-shaft at the Franklin colliery and has worked admirably.

CAVING OF MINES.

The word cave, or cave-in, is generally used to denote the collapse of an extensive portion of the workings of a mine. It seems to be the fate of most of the mines of this region to have "caves" sometime or other and frequently they are the cause of much annoyance, much danger, and considerable expense. Caves occur because the pillars reserved for the support of the overlying strata are not strong enough to support the weight resting on them. This weight increases with the depth of the workings beneath the surface, so that where the overlying strata is twice the thickness there is twice the weight resting on every square foot of the pillars. If we take the average specific gravity of the rocks intervening the coal-seams of this region to be 2.5, which I think is low enough, the average weight per cubic foot would be 156 pounds, and at a depth of 500' the weight of a column one foot square would be 78,000 pounds. In a mine having a vertical depth of 500' about eight-fifteenths of the coal is taken out from the breasts, leaving the remaining seven-fifteenths as pillars to support the overlying rocks.

Delaware, Lackawanna and Western Railroad Company.

At the Woodward colliery in the Bennet seam an underground slope was driven to a distance of 1,228', and its sinking is still continued. Its grade is about 10°, and its sectional area 7'x16'. It was started east of the shaft from the level gangway in a southeasterly direction and it opens a wide extent of excellent coal.

At the Avondale colliery a new underground slope was completed and a new pair of hoisting engines were erected on the surface to hoist the mine cars from the slope. The cylinders are 30"x60", connected directly to the crank of a parallel drum 9' diameter by 14' in length. The foundation of the engines and drum is built of concrete, consisting of broken stone one part, sand three parts and cement two parts. The rope passes down into the mine through a bore-hole 12" in diameter and 238' deep. Communication between the engineer and slope men is maintained by electric signals and conversation may be held by telephone. Everything is finished in good order and equipped for convenience and dispatch in doing the work.

Lehigh Valley Coal Company.

The **Franklin** colliery was leased by this company in March, 1889. Since then they have made many improvements which tend to make the mine safer and more productive. New pumps were put in the Old slope, and new steam pipes were put in from the surface leading through a bore-hole which effected a great improvement.

An air-shaft is being sunk from the surface to the workings of the Red Ash seam in the Rock slope. This shaft has a sectional area of 11'x15' feet and is at a depth of 230'. In the meantime the necessary openings for connecting with the air-shaft are being driven, and will be ready when the shaft is finished.

Alden Coal Company.

In the Alden colliery a rock tunnel was driven from the Ross to the Red Ash seam from the shaft level. This tunnel is 1,035' long and has a sectional area of 84 square feet. The Red Ash seam was found to be 7' in thickness. The water level tunnel was also extended from the Ross to the Red Ash, and penetrated the latter at a distance of 195'. This tunnel also has 84 square feet of sectional area and found the seam 6' in thickness. The workings of these tunnels are connected by a passage driven up from the lower tunnel.

An underground slope was made in the Ross seam 700' long, on a grade of 20°. With the aid of this most of the coal between the lower and upper tunnels can be mined from the Ross seam.

combustible and fire is not likely to occur. This was a desirable improvement, and has added much to the security of the property in that part of the mine.

Lehigh Valley Coal Company.

At the Franklin colliery a new breaker which had been in course of erection during the last year, has been completed and was started to prepare coal for market in June, 1890. It is located at a more convenient point to the slopes than the old one, and is a much better structure, being equipped with what is now considered the best machinery for preparing and cleaning the coal. The old one was abandoned, having given good service for a long period, but it was now in such a dilapidated state that it could not be further repaired.

The air shaft mentioned in my last report has been completed, having penetrated the Red Ash seam at a depth of 425 feet, and is now connected to make a second opening for the Rock Slope workings. A new fan, 20 feet in diameter, was also erected on this shaft which is furnishing a ventilation of 65,000 cubic feet of air per minute when running 50 revolutions per minute. This is considered ample for the present.

COLLIERIES DAMAGED BY A CYCLONE.

A terrible cyclone passed over the city of Wilkes-Barre, at about 5.45 p. m., August 19, 1890, and wrecked two hundred buildings and two coal breakers. Seventeen persons were killed or died in a short time from injuries received, and two hundred other persons were more less injured. The entire loss was estimated to be about half a million dollars.

Two breakers were in the path of the cyclone and were badly damaged, but, fortunately, although several persons were imperilled, all escaped without injury. The Hollenback breaker was struck and the tower over the shaft was driven fully six feet out of line. The roof was taken off the fan engine; all the breaker windows were broken, and the building was twisted out of place at several points. They had considerable trouble to bring the workmen up from the Red Ash seam as they had to be hoisted up the shaft as far as the Baltimore seam. The second opening to the former was not driven yet. And, notwithstanding they were in a perilous situation, they were brought out safely and without injury.

The Hillman Vein Colliery fared worse than the Hollenback. The tower supporting the sheaves or pulleys over the shaft was blown to the ground, leaving the cages fall down the shaft. The steam pipes of the fan were broken, causing the fan to stop, and, to make matters still worse, it happened that a fire was burning in one of the most gaseous gangways of the mine at the time. Although the fan had stopped, efforts were made to extinguish the fire until the danger became too

SUSQ COAL

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 $7 \times 14'$. 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, $8 \times 10'$, 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 $7 \times 15'$ 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 $6\frac{1}{2}$ 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,

property, and it is owned entirely by the Lehigh Valley Railroad Company.

Of the twelve collieries owned and operated by this company in the Wyoming Coal Field, only two are located in the Fourth district, viz: Dorrance and **Franklin**; both these collieries are located in Wilkes-Barre, Pa.

The production in 1894 was 305,261 tons and the shipment was 280,683. Days worked 151.97, and the number of employes was 931. Three were fatally and 16 seriously injured.

In the Dorrance colliery the Baltimore, Hillman, Bowkley and Abbott seams are being worked. The workings are effectively ventilated by two thirty-foot fans located one on each shaft. The roof is generally good, needing but little work in timbering. The workings across under the Susquehanna river are exceedingly dry and dusty. The greatest need for care is to prevent accumulations of fire damp, for a large quantity is unceasingly evolved, but in this they have hitherto been successful.

The openings of the **Franklin** colliery are two main slopes, one on the Baltimore seam, from which, by a tunnel through the upper rocks three of the upper seams are also mined. The other slope is sunk from the surface across the strata to the Red Ash seam on a pitch of about 30 degrees. The Red Ash is in two parts, and both are separately mined. Each slope has a separate system of ventilation produced by a fan located on the upcast of each mine. Another fan is soon to be constructed to ventilate the upper seams of the No. 1 slope. The workings of both slopes are in fair condition, the roof is generally good, except in some localities in the Red Ash seam, where careful timbering is required.

The officers in charge of the mining department are:

W. A. Lathrop, general superintendent.

I. R. Moister, division superintendent.

R. S. Mercur, division engineer.

Robert Shoemaker, outside district superintendent, Dorrance colliery.

Joseph J. Jones, inside district superintendent, Dorrance colliery.

Thomas Samuel, mine foreman, Dorrance colliery.

Frank Eicke, outside foreman, Dorrance colliery.

Thomas R. Thomas, general mine foreman, Franklin colliery.

William N. Thomas, mine foreman, Franklin colliery.

Charles Lynn, outside foreman, Franklin colliery.

Principal officers of the company:

E. P. Wilbur, president, Bethlehem, Pa.

Henry S. Drinker, general solicitor and assistant to president.

Charles Hartshorne, first vice president, Philadelphia.

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

all filled with fire damp. This could not be cleared without a strong air current and the ventilation could not be forced in unless the brattice in the shaft was repaired, and the very act of forcing air in would, most probably, carry the gas to the fire and cause such an explosion as would utterly ruin the mine and its ventilating appliances. Another examination was made on November 23. All the officials and the writer were at the colliery and indisputable evidence of the existence of fire was obtained. Seeing that it was useless to permit any more risks to be taken it was decided to flood the Baltimore seam workings with water to the necessary height for filling the whole workings and measures were at once taken to put this into effect, and no more men were allowed to enter the mine.

By December 10 the water had risen so as to seal the bottom of both shafts, so that it was safe to work at repairing the brattice. While connecting a broken pipe one of the workmen received an electric shock and noticed sparks. There being fire damp near, they ascended the shaft and reported it. Subsequently the electrician of the traction company was sent for and he found that a potential of 4 volts and a current of 12 amperes was in the pipes leading down into the shafts. This electric current was leaking from the current of the Traction company, which was regarded very dangerous for a gaseous mine. An insulator was put in one of the joints of each pipe on the surface to prevent the electric current following into the mine and this proved effective.

At this writing the workings are filled to the required height of 205 feet and the water is being hoisted out. The water is all out of the Hillman slope and the location of the fire was found to have been on the second west gangway. Both the second west and two and one-half west gangway were damaged by the explosions and by falls brought down presumably by the effect of the water on the fireclay roof.

An Explosion of Gas and Fire at the **Franklin** Colliery.

At 12.30 P. M., Saturday, August 15, Fire Bosses John Flynn and William Tredinnick, accompanied by Joseph Hughes, James Monaghan and William N. Thomas, went into the old workings west of No. 1 slope in the Baltimore seam to make a change in the arrangement of the ventilation. They were told to use safety lamps, but ignoring the instructions, they all carried naked lights. Flynn, taking Hughes with him, went some distance away from the others and on breaking down an old brattice stopping, he ignited a body of gas which burned him and Hughes severely and set some old timber on fire. Flynn died on August 17. They had a large force of men for about two weeks endeavoring to extinguish the fire, when it became too dangerous and it was decided to isolate the old workings west of the slope and flush culm enough in to fill it. All the

openings on the side of the slope were closed and a hole was bored down from the surface and culm and water was flushed in. In a few days after closing the openings the air became so mixed with incombustible gases that lights were extinguished and then it was considered safe to work in the other parts of the mine.

This is another instance where recklessly using naked lights where common usage suggested the necessary precaution of using only safety lamps, caused the death of the one who was responsible and also caused an endless amount of trouble and expense. It has been demonstrated in this district many times that it is a good rule to not permit a fire boss to carry a naked light at any time, because he is more inclined to take chances than any other employe, owing to his familiarity with the mine.

The Fire in the Conyngham Mine of the Delaware and Hudson Canal Company.

In my report for the years 1891 and 1892, an account of the fire in this mine was given. At the close of the year 1892 the mine was filled with water to a height of 346 feet. Since then it has been pumped out and in the latter part of 1895, finding that all the workings had caved under the effect of the water, the operators put a force of men to clean and re-open the gangways and second opening. An examination of the workings on the head of the gravity plane revealed that the temperature was still several degrees higher than the normal. It could be seen where this heat came from but those parts of the workings were all caved and could not be examined. By the middle of February, 1896, the heat was becoming more intense and the gaseous products of fire began to appear in the returns. Efforts were made to effect openings, so that it could be determined positively that fire was existing.

On August 19 the Mine Inspector, accompanied by Mine Inspectors Hugh McDonald, of the Third district, and Edward Roderick, of the First district, made an examination and were convinced beyond doubt that the caved part of the workings east of the head of the plane was on fire and so reported to the company. The Inspector received a notice on August 24 that the pumps were stopped and that it was decided to fill the mine with water to a height of 400 feet.

By January 13, 1897, the water had filled to a height of 313 feet and the Inspector being apprehensive of danger to the employes of the Hollenbach colliery of the Lehigh and Wilkes-Barre Coal Company, from the pillar between the two collieries giving way under the pressure, notified the officials of that colliery to suspend all work in the Hollenback shaft until the water in the Conyngham had reached the required height; they complied by suspending work the next day. (See map of the pillar in report for 1891.)

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

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

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

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

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

Improvement by the Lehigh Valley Coal Company During 1902.

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

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

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

The tower over the main hoisting shaft was rebuilt.

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

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

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

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

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

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

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

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

to determine safe working rock cover on the flats near the river. New concrete cribs have replaced the old wooden ones in both hoist and ventilating shafts. New and improved safety gates and stop blocks put on Baltimore shaft. New brick electric light house. New brick and concrete safety lamp house. New concrete pump house on river bank.

Franklin Colliery

No. 8 slope extended 320 feet to Brown pillar line. No. 8 tunnel extended 190 feet to Ross vein. No. 15 tunnel is being driven from Red Ash rock slope to Ross, 480 feet to date. Tunnel extended 150 feet in Baltimore slope district to Abbot vein. New tunnel from top to bottom split of Red Ash completed. A new slope started in Ross vein. A new inside slope begun in top split of Red Ash. The old Brown slope reopened. Work is progressing on installation of 300 additional H. P. return tubular boilers. New fan, blowing engine installed. New 14x20 engine set in place at Red Ash second outlet shaft. New corrugated iron powder house. New dam and corrugated iron pump house. Washery completed and working. Number of repairs and alterations made in breaker. Baltimore fan house rebuilt.

SUSQUEHANNA COAL COMPANY

Colliery No. 5

Outside.—Jig house completed. New steel bridge over breaker tracks. New compressor house, and 2-20 $\frac{1}{2}$ and 36x20x36 Ingersoll-Sergeant duplex two stage compressors. One hundred new steel mine cars.

Inside.—Rock plane, Mills to George, unfinished.

Stearns

Inside.—No. 4 shaft tunnels and returns completed, rock turnout for empty cars unfinished. New plane in Ross unfinished.

Colliery No. 7

Outside.—New lamp house completed. New timber yard completed. Remodelling No. 7 breaker, unfinished.

Inside.—New plane in Cooper seam unfinished. Slope No. 14, Ross seam.

Colliery No. 6

Outside.—Two thousand five hundred H. P. B. & W. boiler plant completed, and old cylinder boilers at No. 6 shaft and No. 6 slope abandoned. New rolls and screens in breaker. New railroad from No. 7 shaft to breaker, about 1 $\frac{1}{2}$ miles, completed.

Inside.—New tunnel slope No. 6 to N. shaft No. 6, unfinished.

LEHIGH VALLEY COAL COMPANY

Dorrance Colliery.—New inside stable for 54 mules completed in Baltimore vein. Stable is a model; every precaution taken against fire; lighted by electricity; Baltimore shaft extended 100 feet, will be continued to the Red Ash vein; No. 13 rock slope for second outlet Red Ash development, extended 460 feet; No. 6 rock slope driven 350 feet through Mill Creek anticlinal, will be continued to Bennett vein basin; No. 9 slope in Bennett vein sunk 1,080 feet; No. 10 slope in Bowkley vein sunk 210 feet; No. 12 slope in Hillman vein river warrant extended 900 feet; No. 7 tunnel, Bennett to Cooper vein, completed, 115 feet; No. 5 tunnel, Hillman to Snake Island, finished, 125 feet; No. 8 tunnel, Hillman to Five Foot, completed, 160 feet; No. 10 tunnel, second opening, completed 455 feet; No. 1 tunnel, Hillman to Bowkley, driven 165 feet and being continued to the Abbott vein; No. 13 tunnel, Hillman to Abbott, driving, 170 feet; new steam brake and steam reverse placed on Baltimore and Hillman shaft hoisting engines; a new Williams crusher installed and all refuse from breaker being ground up and silted in mines; brick house completed and 2 20-31x32-20x24 air compressors being installed; new electric light plant finished for light in breaker and other buildings, also inside stables, foot of shaft, pump houses, etc.; additional mechanical pickers in breaker, also 1 new slate conveyor; 75 additional mine cars.

Franklin Colliery.—No. 7 slope, Sump vein, extended 605 feet; No. 9 slope, Top split of Red Ash vein, sunk 615 feet; No. 10 slope, Ross vein, extended from counter to bottom lift, 1,100 feet; No. 11 slope, Sump vein into Franklin Overturn Basin, 300 feet; No. 15 tunnel from Abbott to Snake Island vein, finished, 120 feet; a new inside stable is being made for 36 mules in Sump vein; a new pump placed and water being pumped out of the old Baltimore fire district; a large sump made in Red Ash vein, two additional pumps placed with new column pipe to surface, preparations being made for central pump plant; work now being pushed developing the smaller and over-lying veins, also re-opening the caved Hillman vein district; the breaker has been over-hauled; new elevators; conveyor lines; mechanical pickers, etc., steam heat, fire protection lines; additional railroad trackage room provided; 100 new mine cars; both collieries have well equipped fire companies.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Auchincloss Colliery—Inside.—Six rock tunnels have been driven connecting the different seams for the purpose of development and ventilation. No 2 slope, Ross vein has been graded for 335 feet on an average dip of 19 degrees. Ross vein has been graded for 335

South Wilkes-Barre No. 5 Colliery

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

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

Stanton No. 7 Colliery

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

Sugar Notch No. 9 Colliery

Outside.—Supply store; started erection new breaker.

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

Maxwell No. 20 Colliery

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

LEHIGH VALLEY COAL COMPANY

Dorrance Colliery

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

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

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

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

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

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

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

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

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

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

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

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

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

Franklin Colliery

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

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

No. 11 Sump vein slope equipped with 12x12 hoisting engine on surface and rope hole.

New stable finished in Sump vein.

Extraordinary repairs and changes made to breaker, circular screens being dispensed with shakers, also additional mechanical pickers.

Thirty-five new steel cars.

New rock slope started and sunk 200 feet during past year from surface. Idea being to connect with inside No. 10 slope, Ross vein.

Silting has been continued and extended in the top split of Red Ash and Ross vein district.

A new bore hole for silt.

William's crusher and engine installed, taking care of refuse from breaker.

Warrior Run Colliery

New boiler house finished.

One thousand five hundred H. P. return tubular boilers installed, equipped with eight foot fan blast, new feed pump and Cochran water heater. The three old cylinders and return tubular boiler plants dispensed with.

New steam lines have been completed between boiler house and Buck Mountain and Rope Hole engine houses.

Williams crusher installed and silting extended.

The breaker is now equipped with mechanical pickers.

A system of fire protection lines, fire hydrants, fire pump, etc., installed.

A bore hole is being drilled from surface to carry steam to the inside pump.

Every effort is being made by the present operators to bring this colliery in a safe working condition.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Auchincloss.—Made no improvements of note outside at this colliery.

Inside improvements consist of the following:

Seven by twelve rock tunnel from Baltimore to Forge vein. Length 190 feet.

Seven by twelve rock tunnel for ventilation, Forge to Baltimore vein, on a pitch of 30 degrees.

No. 5 tunnel No. 2 shaft was extended from Forge vein to Ross vein, a distance of 369 feet.

Besides this three other short rock tunnels were driven through faults, being necessary in connection with the development and ventilation of this colliery.

During the year several mine fires occurred at this colliery, some of which were very difficult to contend with, but fortunately no one was injured in subduing the fires.

Bliss.—No improvements of note were made either inside or outside at this colliery during the year.

Truesdale.—This mammoth breaker began operation on November 8, and is one of the largest in the Anthracite region. The management of the company has spared no labor or expense in putting up

Prospect Colliery.—The electric transportation roads have been extended in the Red Ash Vein, and preparations are under way for the installation of further electrical equipment in haulage hoist and dumping in this colliery.

Dorrance Colliery.—Tunnels were started from the foot of the Baltimore shaft to tap the Red Ash Vein, also a tunnel at that point for the empty car and foot turnouts.

Tunnels Numbers 11 and 12 were completed from Hillman to the Bowkley.

Tunnels Numbers 15 and 17 completed from 5 foot vein to the Hillman Vein.

Tunnel Number 16 completed from Hillman to Abbott.

Tunnels Numbers 18 and 19 completed from Cooper to the Bennett through the Mill Creek anticlinal.

The tunnel from the foot of No. 6 Rock slope was finished to the Bennett Vein, and a second outlet tunnel through the Mill Creek anticlinal is being driven.

A new stable is being constructed in the Hillman Vein.

Silting has been extensively carried on at this colliery in the Hillman, Abbott and Bowkley Veins.

A new No. 20 sub-slope in the Baltimore has been started.

Numbers 14 and 16 sub-slopes have been continued in the Cooper Vein.

Number 15 sub-slope in the Bennett and No. 13 in the Red Ash have been continued.

Number 2 slope in the Baltimore Vein has been reopened and is being extended.

Number 12 slope in the Hillman River Warrant has been extended.

A new electrical hoist and transportation outfit is being installed.

A new brick concrete mine locomotive house built.

Dust house torn down and replaced with stack devices for killing dust.

A new frame carpenter and blacksmith shop completed.

New standard warehouse built.

Franklin Colliery.—Number 10 Rock slope surface to rope vein completed, giving an additional outlet for the Rock slope Red Ash-Ross district.

Number 21 Tunnel finished from sump vein to 5 foot vein.

Number 22 Tunnel finished from sump vein to Baltimore vein.

A new central pumping plant is under construction in the Red Ash vein, equipped with 28x12x36 compound duplex pump, with 14 inch column pipe bore hole, 12 inch steam hole and exhaust hole from the Red Ash to the surface.

A 14 inch drainage bore hole from the surface to the Ross vein has been made through which all the water from the upper lifts of the long slope district will be drained to the central pump plant in the Red Ash.

New steam lines are under construction for the above plant.

The following slopes were extended during the year:

Number 9 Slope Top Split of Red Ash.

Number 4 Bottom Split of Red Ash.

Number 11 Slope Sump Vein.

Number 7 Slope Sump Vein.

Number 8 Top Split of Red Ash.

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

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

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

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

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

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

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

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

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

2-10 ton electric locomotives installed in Hillman vein.

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

Extension was made to new Hillman vein stable.

Outside

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

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

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

LEHIGH AND WILKES-BARRE COAL COMPANY

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

No. 19 Tunnel extended to Ross.

Rock Plane airway Stanton to Hillman.

No. 5 Slope graded through rock.

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

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

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

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

Henry, Outside.—Preparations to reclaim Enterprise culm bank on east of Plank Road. Series of surface test holes for Hillman vein rock cover.

Inside.—Second opening traveling way to surface for No. 8 Slope workings.

Rock return air course for Wyoming Lower Baltimore workings completed.

Tail rope engine plane No. 5 Slope, Wyoming Skidmore vein, started.

Concrete steel overcast, No. 15 plane, completed.

Considerable work done repairing and improving No. 2 Lift, No. 10 Slope.

Dorrance, Outside.—No. 4 air shaft 13 feet 10 inches x 25 feet 2 inches from surface to Baltimore completed. 28 x 7½ foot Dickson-Guibal fan, driven by 24 x 48 Allis-Chalmers, 4 valve Corliss engine, capacity 300,000 cubic feet per minute at 3 inches W. G. installed and operating.

35 x 12 foot Guibal fan house and drift completed; to ventilate the Hillman vein district when change from present location is completed.

No. 3 air shaft, wooden cribbing removed and lined with concrete to vein, and provided with iron ladders for second opening traveling way.

Inside.—New motor road in Hillman vein completed.

Rock plain gangways in Abbott vein reopened.

Silting operations in Hillman West Plain district.

Engines installed on No. 23 Red Ash Slope.

No. 6 Extension Slope reopened.

No. 21 Slope, Hillman vein, connected with No. 17 Tunnel.

Hillman vein new stable extended.

Concrete arch at Hillman vein landing started.

New brick hospital in Red Ash vein.

Franklin, Outside.—Extensive repairs to breaker and breaker machinery.

Washery dismantled.

Series of surface test holes for Snake Island rock cover.

Inside.—New plane in Abbott vein, No. 2 lift, completed.

New manway for No. 7 Slope, Sump vein, completed.

New manway for No. 2 Slope, Sump vein, completed from No. 2 lift to surface.

New manway to No. 9 Slope, Top Red Ash, completed.

Debris from Bowkley surface cave cleaned.

Water in Baltimore vein lowered to No. 2 level.

Baltimore No. 2 West lift reopened, and engine installed on No. 14 Slope. No. 2 Slope Sump vein extended from No. 1 to No. 2 level.

No. 15 Slope in Bowkley started.

Drift level Baltimore West reopened and gangways extended west.

Drift level Skidmore and Ross veins gangways cleaned and reopened.

No. 22 Tunnel Forty Fort vein gangways cleaned and reopened.

Hillman No. 2 west gangway cleaned and reopened. No. 10 Skidmore Slope extended below No. 8 Tunnel level.

Pump installed and water lowered in No. 9 Slope.

No. 8 Slope, Red Ash (Top) extended through rock to Bottom Red Ash on No. 3 Slope level.

plan. An 8-inch bore hole was completed from the lower Baltimore to the Red Ash vein. A concrete-steel air bridge was built in the Five Foot vein east of No. 14 slope.

Dorrance Colliery

Outside: A new brick garage was completed. New foundations were constructed under the breaker plane and a B. G. Carpenter and Co. dust collector was installed on the east side of the breaker. The 35 x 12 foot Guibal fan was moved from No. 1 shaft to No. 2 shaft, for the purpose of ventilating the upper veins. No. 1 Shaft was concreted to the Rock on north side.

Inside: The concrete and steel roof supports at the Hillman landing were continued and considerable loose rock and old timber were removed. Silting operations were continued in the Hillman West Plane district and diamond drill bore holes to prove the Bennett vein north of the fault were completed. Electric motor haulage was installed in the Red Ash tunnel level district. No. 24 slope in the Red Ash vein was started and No. 13 slope extended. A mule stable was constructed in the Red Ash vein. New engine planes were started in the Hillman, Bowkley and Abbott veins on the east side. Preparations were made to resilt the Baltimore and overlying veins on the east side of the shaft.

Extensive developments were made in the No. 21 slope district in the Hillman vein.

Franklin Colliery

Outside: Extensive repairs were made to the breaker. A series of test holes was made to prove upper veins in the Gin and Brown slope basins. The Bowkley vein upcast shaft was concrete lined.

Inside: A new rock manway was completed from the Bottom Red Ash to the Top Red Ash, near the foot of Rock slope, and No. 25 tunnel from the Top to the Bottom Red Ash vein was completed.

No. 16 Slope in drift, Skidmore vein, was started. The Bottom Five Foot gangways on No. 2 level were cleaned of mud and debris from the Bowkley cave. No. 1 tunnel was cleaned to the Hillman vein. A new hospital has been completed in the drift workings. Silting operations were continued in the Rock slope and Baltimore vein districts. A second opening is being driven for the Snake Island vein to the Hillman level, and a second opening to the drift Skidmore was completed. The pumping plant on the Hillman level was discontinued and the water is now handled directly from the No. 2 level. Preparations were made for reopening Brown slope, to extend No. 21 tunnel to the Hillman vein, and to drive No. 27 tunnel from the Bottom Five Foot to the Hillman vein, and the head of No. 6 Plane level, and also to drive No. 26 tunnel from the Top Red Ash to the Skidmore vein on No. 25 tunnel level.

Warrior Run Colliery

A series of test holes to prove the overlying veins was completed. A new slope from the surface to the Hillman vein was sunk. Work was started on dismantling the old breaker. Colliery buildings were repainted and the silting of the burning rock bank continued.

Dorrance Colliery.—Outside: The dust collector at the breaker was remodeled. A new addition to the compressor house for the dynamo was built and a new drum on the Red Ash shaft engine installed. A series of test holes for proving the rock cover in the river bed was drilled.

In the breaker a complete fire alarm system was installed.

Inside: Concrete steel roof supports were continued at the Hillman Foot of Shaft, and grading the head of No. 24 slope in the Red Ash vein was practically completed. A new electric hoist and "I" beam roof supports were installed. Electric haulage was installed in the Hillman vein No. 21 slope district, using one motor. In the Red Ash vein the electric haulage was extended and a new motor installed. Three new planes were graded in the Upper veins on the east side of the shaft and two electric hoists were installed.

Diamond drill proving of the fault in No. 6 Extension slope was continued. A new tunnel to shorten haulage in the Bennett and Cooper veins was started and Nos. 13 and 23 slopes in the Red Ash vein were extended.

Franklin Colliery.—Outside: Extensive improvement to the breaker were made, practically rebuilding same. A new engine house was built for No. 10 slope. Diamond drill provings for the Five Foot sump veins in the Gin and Brown Slope basins were carried on. A second opening shaft to the Snake Island vein was sunk and concreted.

Preparations were made to silt the Bowkley vein, and about 1,000 feet of wooden silt line laid. A complete fire alarm system was installed in breaker, and to the equipment was added 100 new standard steel under-frame cars.

Inside: In the Bottom Ash vein a new slant slope was started to develop the northern section of the property. A new slope in the Skidmore vein was also driven in No. 4 tunnel workings. Diamond drill provings for the Ross vein in No. 4 tunnel were carried on. Silting was continued in the rock slope district. A new manway for No. 9 slope in the Top Red Ash vein was completed. In these workings No. 26 tunnel with a length of 230 and 290 feet respectively was driven from the Bottom Five Foot to the Hillman and Bowkley veins in the Long Slope workings. Work on the new concrete barn in the Rock Slope was started. It is the intention to install on No. 25 tunnel level a new 12 by 32 by 36 Scranton pump.

Warrior Run Colliery.—Inside: A new second opening plane from "B" to "C" veins in the robbing section was started, and also the reopening of lifts off No. 1 slope. Good progress was made pumping water from No. 2 slope, which has been flooded on account of fire.

Outside: A new slope was sunk from the surface to the Hillman vein and 100 feet of concrete roof supports installed. A trestle, dump and siding from Lehigh Valley Railroad were constructed and an engine with 1400 feet of 6 foot steam line installed.

WILKES-BARRE ANTHRACITE COAL COMPANY

Hillman Vein Colliery.—The inside slope was extended 264 feet and a 325 horse power electrical hoist installed.

new Goyne pump was installed on No. 12 slope, Hillman vein, to handle silt water. A tunnel was started from the Cooper to the Lance vein, the Lance vein coal to be transported by motor to the new No. 21 tunnel mentioned above.

Outside.—Both silt holes near the breaker were reamed and made larger and terra cotta pipe inserted and cemented. Two Welch over-winding devices were installed, one on the Red Ash and one on the Hillman hoisting engines. Extensive repairs were made in the breaker and the breaker plane renewed.

Franklin Colliery:

Inside.—No. 27 tunnel, 222 feet long, was driven from the Bottom Five Foot Northward, cutting the Top Five Foot and Hillman veins. No. 28 tunnel, 264 feet long, was driven from the Sump vein to the Bottom of Five Foot in the Gin slope basin. Rock plane, 107 feet long, was driven as a second opening to No. 28 tunnel. No. 29 tunnel, 165 feet long, was driven from the Top Red Ash to Ross vein on No. 29 tunnel level. The 12x32x36 inch Scranton pump mentioned in last year's report was installed on No. 25 tunnel level, and a concrete pump-house is about two-thirds completed. A 2-inch drainage hole was drilled from Bottom to Top Red Ash to tap water in No. 8 slope. A 3-inch horizontal bore hole was drilled from the Skidmore vein on No. 26 tunnel level to the Baltimore vein, a distance of 340 feet, to tap water in the Long slope. The Baltimore vein at the foot of the Brown slope was re-opened to No. 5 tunnel, the tunnel cleaned and the roads laid to the Red Ash Vein. A manway for No. 10 slope was completed from the Skidmore vein to the surface. Work on the new concrete barn in the Rock slope was carried on and is nearly completed.

Outside.—A new pair of engines were installed on the Brown slope and a brick engine house erected. Old feed water heaters were taken out and a 2,000 H. P. Cochrane heater installed. A new shifting shanty was built. The Sump vein fan was dismantled and installed at the Warrior Run slope. Repairs to the dry side of breaker were completed and the old rolls replaced with new compound rolls. A new 40-foot track scale with new scale house was built and considerable grading done for the proposed rearranging of loaded car tracks.

A 10-inch rope bore hole was drilled from the surface to the head of No. 9 slope. The 16x24-inch geared engines formerly at Coal Brook were installed on the surface and the 12x15-inch engines on the inside removed. Bore holes were put down from the surface to prove the Sump vein in the Brown slope district. The old boiler drain near the Long slope engine house was removed and a concrete arched culvert constructed and the yard considerably graded and improved in that vicinity. Concrete retaining wall at the foot of breaker plane was constructed. A new roof was placed over the breaker plane.

MINE FOREMEN'S EXAMINATIONS

The annual examination of applicants for certificates of qualification as mine foremen and assistant mine foremen was held on April 4 and 5, in the Y. M. C. A. Building, Wilkes-Barre. The Board of Examiners was composed of Thomas H. Price, Mine Inspector; Morgan R. Morgans, Superintendent; and William Chappell and Patrick McGrane, Miners.

Outside.—A concrete fan house was built in which a 20-foot fan was installed to ventilate the Hillman and Five Foot veins, releasing two old 15 foot fans. A concrete crusher house and conduit to take ashes from the boiler house to two 10 inch bore holes from the surface to Lower Baltimore vein were constructed. An addition to the outside barn, to quarter an additional number of mules, was also completed.

Warrior Run.—Inside: No. 8 tunnel was driven from the C to the D vein a distance of 210 feet. No. 22 tunnel was driven from the Hillman to the Mills vein, a distance of 210 feet to develop a virgin area. No. 5 rock plane on 30 degrees was driven a distance of 105 feet from the Hillman to the Mills vein to serve as a second opening. Built pump house of fireproof material at the foot of the old slope in the B vein.

Outside.—A concrete fan-house was built, in which was installed a 16-foot fan to replace two fans that were in poor condition, one of which was destroyed by fire. A concrete powder house was also constructed.

Dorrance Colliery.—Inside: The Hillman, Baltimore, Red Ash and Rock slope fireproof barns were completed. Two electric motors were placed in the Cooper vein, No. 21 tunnel section, and 2 in the Red Ash vein, No. 24 slope section. A 4-inch hole was drilled from the Hillman to Cooper vein 384 feet deep, and a 4-inch hole was drilled from the Cooper to the Red Ash vein 265 feet deep, to carry electric cables. A 4-inch drainage hole, 62 feet deep, was drilled from the Bowkley to the Hillman vein, to release the pump in the Bowkley vein. A 10-inch hole was drilled from the surface to the Baltimore vein for silting purposes, depth 605 feet. No. 19 rock plane was driven at foot of No. 6 extension slope from Bennett to Bennett vein, through a fault a distance of 90 feet. New guides were placed in the Hillman shaft from the surface to the Hillman vein, and also in the Red Ash shaft from the surface to the Baltimore vein. The construction of a pump room in the Baltimore vein and also in the Hillman vein was started, for the installation of two 1,500-gallon capacity pumps to take care of the large silting operations being carried on.

Outside.—The breaker was practically rebuilt, concrete retaining walls being placed at the foot of the breaker plane to replace wooden posts.

Franklin Colliery.—Inside: No. 18 rock slope was driven from the Brown slope in the Baltimore vein to the Sump vein, a distance of 243 feet. The fireproofing of the rock slope barn was completed. A 4-inch drainage hole was drilled from the Skidmore to the Baltimore vein, a distance of 292 feet, to unwater a large territory.

Outside.—The concrete foundation for the new breaker was completed and a shaft 8 feet square was sunk a depth of 60 feet from the surface to the old workings in the Baltimore vein, with a view of silting the openings under the breaker foundations. Entrance of the rock slope was concreted. Built engine house for No. 9 slope and installed therein a pair of 20 by 30 engines.

DELAWARE AND HUDSON COMPANY

Baltimore No. 5 Colliery.—Rock plane air return, Red Ash to Red Ash Top Split in Conyngham shaft, 7 feet by 12 feet by 120 feet, 12 degree pitch.

tinued. Installed two Williams crushers in order that the refuse could be silted into the mines. A 14-inch bore hole was drilled from the surface to the Baltimore vein for that purpose. A concrete ditch was constructed from the boiler house to the bore hole in order to flush ashes into the mines. An outside hospital was also constructed. A ditch for the installation of steam lines from the Dorrance Colliery to the new office building was constructed and the lines laid.

Prospect Colliery.—The rock work for the installation of the large pump in the Midvale-Hillman vein was completed and concrete side walls were started. A 15-degree rock plane was driven from the Upper Baltimore through a fault to the Five Foot vein. The work of fireproofing the barns in the Baltimore and Red Ash veins was completed. Roof supports were placed in the Midvale slope to support the engine house. A concrete overcast was built in the Red Ash vein. An electric hoist was placed on No. 26 slope, the new slope being driven in the Skidmore vein.

Outside: The Midvale-Hillman slope and No. 10 slope engine houses were made fireproof. A concrete retaining wall was built along the plank road east of Midvale shop. Two 8-inch bore holes were drilled from the surface to the Hillman vein for the purpose of silting boiler ashes. A concrete ditch was constructed to carry ashes from the boiler house to the bore hole. An addition to the small pump house was made to serve as an outside hospital. A mess house which was provided with all conveniences for the employes was completed.

Franklin Colliery.—Concrete batteries were built in the Baltimore vein under the new breaker to allow openings to be filled with silt. A new concrete fire boss station was started in the top Red Ash vein at the head of No. 9 slope. An 18-degree rock plane 150 feet long was driven from the bottom to the top Red Ash vein to mine a basin of virgin coal.

Outside: A new steel breaker to replace the old wooden structure was constructed. A new fireproof office and shop of tile was started. Concrete reservoir was constructed and a 12 inch C. I. pipe line was laid to conduct the water from Worthington pump bore hole to the reservoir. Installed new heads at the Rock and Long slopes. A new fuel conveyor line from the breaker to the boiler house was constructed. One 16 inch and two 8 inch holes were drilled from the surface to the Red Ash vein, a distance of 450 feet, to conduct the silt from the breaker to the mines. A 6 inch hole was drilled from the surface to the old Baltimore workings for drainage of the condemned coal conveyor pit. The Long slope engine house was reconstructed of fireproof material. A 16 by 20 inch engine was placed on the Brown slope to facilitate haulage.

Warrior Run Colliery.—Drove a tunnel from the Hillman to the Five Foot vein, a distance of 505 feet, for which a second opening 230 feet long from the Five Foot to the Hillman vein, was started. A concrete overcast for the return air from the Mills vein was built in the Hillman vein. No. 8 tunnel from the C to the D vein was completed. The mouth of the B vein slope was concreted.

Outside: A concrete fan house over the E vein shaft was completed. The outside plane engine house was made fireproof. A new hospital 10 by 14 feet was also constructed of fireproof material. Part of the wooden flume to conduct water across the property was reconstructed.

to Hillman vein to conduct steam pipes. A 6-inch bore hole from the Abbott to Bowkley and a 6-inch bore hole from Bowkley to Hillman vein were drilled so as to concentrate drainage at Midvale in the Hillman vein. The placing of concrete and steel roof supports at the foot of the Red Ash was started. An electric hoist was installed at foot of slopes Nos. 26, 28 and 29. Installed an air compressor at head of No. 4 plane. A concrete overcast was constructed in Red Ash vein.

Outside: The Midvale Abbott fan house was reconstructed of reinforced concrete. One Gates crusher, two Williams pulverizers and an 18 inch by 30 inch engine were installed under the breaker to crush refuse before flushing into the mine workings. A shaft was sunk from the surface to Hillman. A concrete and terra cotta ditch was constructed from the breaker to the shaft to conduct refuse from the breaker into the mines. A 16-inch bore hole was drilled from the surface to the Hillman vein, a depth of 520 feet, and 12-inch column line installed for discharge from the new pump in the Midvale-Hillman vein. A spray system for fire protection was installed in the breaker and pump placed in the boiler house to pump water from the reservoir to head of breaker. Seven Simplex jigs were installed in the breaker. Installed a 125 K. V. A., Allis-Chalmers, 220 volt engine, which will furnish light for Dorrance, Prospect and Henry collieries, and the new office building of the Company.

Franklin Colliery.—Inside: Completed No. 30 tunnel, Baltimore to Sump vein. Started No. 14 rock plane, Red Ash to Top Red Ash; No. 15 plane, Skidmore to Baltimore vein. Completed concrete fire boss station on No. 9 slope, and one in No. 6 tunnel.

Outside: A new fireproof engine house of concrete and terra cotta tile was constructed for the Rock slope. A mess and wash-house of concrete and hollow tile was also constructed for employes. The tile shop and office were completed. Concrete foundations for installation of a new Multi-vane steel fan and engine house at the Red Ash shaft were completed. The exhaust from the breaker engine was conducted into the feed water heater in the boiler house. Driveways under breaker were paved with brick. A 20-inch bore hole for discharge from the Worthington pump has been drilled.

Warrior Run Colliery.—Inside: No. 30 rock plane was driven from Five Foot to the Hillman vein for ventilation and second opening. An engine was installed in the Mills vein to handle coal from the west side of No. 22 tunnel. A drift was driven from the surface into the "E" vein.

Outside: The "B" slope engine house, inside slope engine house and compressor house were made fireproof with metal lath and plaster. Foundation walls under the boiler house were reinforced. Two new fireproof foremen's offices were erected.

DELAWARE AND HUDSON COMPANY

Baltimore No. 5 Colliery.—Completed tunnel, through anticlinal, Baltimore to Baltimore vein; electric locomotive road through fault in Red Ash vein on shaft level; 6-inch bore hole, 267 feet deep, Hillman to Baltimore vein at Conyngham. Installed an 8-inch centrifugal 1,500 gallon Sludge Pump on surface. Washery refuse from Baltimore No. 5 to Conyngham for inside filling.

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.

Installed a 12 by 24 inch Vulcan hoist and a No. 10 Knowles pump on No. 20 slope in Skidmore vein. Constructed a concrete air bridge on No. 9 slope.

Built an addition to the Long slope barn.

Outside: A steel tramway was erected over the timber yard. A concrete entrance to sump slope manway was constructed. A new powder-house of concrete and hollow tile was built. The ground immediately west of the breaker was converted into a lawn and 100 feet of concrete laid in constructing the driveway. A concrete and hollow tile engine house was built and engine installed to operate fuel conveyor from the breaker to the boiler house.

PITTSTON COAL MINING COMPANY

Hadleigh Colliery.—Completed rock tunnel, from outside to Ross vein, a distance of 100 feet; also completed second opening; rock slope from Cupola to Twin vein, distance 200 feet; coal slope in Red Ash vein a distance of 440 feet, and drove a rock plane, from No. 4 tunnel, a distance of 200 feet to the Ross vein.

Installed one 125 horse power Lidgerwood electric hoist; one 14 by 20 by 11 by 18 compound duplex Laidlow-D-Gordon pump in Red Ash vein.

Built a concrete pumphouse, 60 by 30 by 10 feet, equipped with steel and arches, reinforced, and with all necessary fire protection.

Completed 500 feet of 8-inch cast iron pipe line from foot of shaft to No. 4 tunnel; retimbered shaft from surface to Red Ash vein.

Outside: Installed one Roybel overwinding device for safety; one 15-ton locomotive crane; 10 dump cars; one Scranton duplex plunger pump 12 by 7 by 12 inches with 300 feet of water line for breaker; two feed water pumps in boiler plant.

Built a washery with a capacity of 500 tons per day, equipped with shakers and simplex jigs, type "D," driven by one 50 H. P. G. E. motor. Constructed dam 50 by 25 by 10 feet of reinforced concrete and steel, for water supply to breaker for fire protection.

MINE FOREMEN'S EXAMINATIONS

The annual examination of applicants for certificates of qualification as mine foremen and assistant mine foremen was held in the City Hall Building, Wilkes-Barre, June 6 and 7. The Board of Examiners was composed of Frank Kettle, Mine Inspector; Sheldon Jones, Superintendent, Wilkes-Barre; George W. Raub, Miner, Plymouth; and Patrick McGrane, Miner, Sugar Notch.

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

MINE FOREMEN

Thomas J. Evans, Arthur Davis, Joseph Ruddick, Nanticoke; John Driscoll, Esau Davies, Plymouth; Edward J. Williams, William R. Williams, Warrior Run; John S. Lyons, Wilkes-Barre; Fredrick Holzberger, Dorranceton; John M. Williams, Rhone; Thomas F. Carr, Concrete City; William J. Williams, Buttonwood; Thomas L. McGuire, Rhone.

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

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

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

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

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

LEHIGH AND WILKES-BARRE COAL COMPANY

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

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

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

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

LEHIGH VALLEY COAL COMPANY

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

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

more to the Skidmore vein, a distance of 190 feet; No. 37 tunnel in the drift workings, from Sump vein to the Baltimore vein; No. 38 tunnel, in the old slope workings, from the Sump vein to the Bottom Five Foot vein; No. 18 rock plane to tap a virgin area in the Bottom Five Foot in the Brown slope basin. In addition to the tunnel work, No. 17 rock plane was nearly completed from the Top to Bottom Red Ash vein, rock slope workings, for the purpose of developing the basin below No. 34 tunnel level.

Fifty new mine cars were received and put into service during the year.

Outside: A 10 inch bore hole was put down from the surface to the Skidmore vein, near the boiler house, for the purpose of flushing ashes into the mine.

An addition to the rock slope engine house was completed for an engine and electric generator to light the colliery yard and buildings.

MINE FOREMEN'S EXAMINATIONS

The annual examination of applicants for certificates of qualification as mine foremen and assistant mine foremen was held in the City Hall Building, Wilkes-Barre, May 8 and 9. The Board of Examiners was composed of Frank Kettle, Inspector; Sheldon Jones, Superintendent, Wilkes-Barre; George W. Raub, Miner, Plymouth; and Patrick McGrane, Miner, Sugar Notch.

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

MINE FOREMEN

William T. Dixon, William McHale, William Richards, Daniel Thomas, John H. Thomas, Nanticoke; George Lawrence Evans, John A. Hamilton, David A. Noble, Edwin Smith, Francis Walker, Plymouth; Walter C. Fancourt, Dorranceton; Joseph A. Motley, Warrior Run; John Bevan, Wilkes-Barre; William Pritchard, Jr., Buttonwood; John H. Davis, Nanticoke.

ASSISTANT MINE FOREMEN

Daniel Davies, Albert Farr, Joseph Foley, Lewis Jones, Stanley Kaminski, Frank Maday, George Phillips, Thomas P. Long, Edward S. Powell, David Williams, Nanticoke; Ignatz Charles Berger, Lee Park; Michael Charles Brennan, Emanuel Howells, James Maxwell, Martin Stamer, Hugh Williams, Plymouth; Patrick J. McGuire, Raymond Daniel Gorham, Ashley; Hugh Henrathy, Wilkes-Barre.

Sugar Notch No. 9 Colliery.—Completed extension of No. 31 tunnel from Hillman to Kidney vein; extension of No. 32 tunnel from Hillman to Kidney vein; and extension of No. 9 tunnel from Ross to Red Ash vein. No. 37 tunnel was driven from outside tunnel east, Top Red Ash to Bottom Red Ash vein; No. 38 tunnel from outside tunnel west, Top Red Ash to Bottom Red Ash vein; and tunnel through fault, Stanton to Stanton, No. 15 tunnel west.

Buttonwood No. 22 Colliery.—Installed 18 by 30-inch hoisting engines and houses at Red Ash shaft and Inman No. 21 shaft.

LEHIGH VALLEY COAL COMPANY

Franklin Colliery.—Completed No. 17 rock plane, Top Red Ash to Bottom Red Ash vein, in rock slope workings; No. 39 tunnel, Long slope workings, from Bottom Five Foot to Hillman vein; No. 40 tunnel, Long slope workings, from Bottom Five Foot to Top Five Foot vein; and No. 18 rock plane and second opening in the drift workings, from Sump vein to Bottom Five Foot vein. Installed electric dynamo, and placed lights at foot of rock slope and in mule barn.

Warrior Run Colliery.—Completed fireproof foreman's office on No. 1 lift, New slope.

GEORGE F. LEE COAL COMPANY

Chauncey Colliery.—A new breaker has been erected to replace the old one. Completed rock plane from Red Ash to Ross vein, and installed electric power to operate all machinery inside and outside of mines.

WEST NANTICOKE COAL COMPANY

West Nanticoke Colliery.—Completed rock slope from surface to Ross vein. Preparations are being made to erect a new breaker.

MINE FOREMEN'S EXAMINATIONS

The annual examination of applicants for certificates of qualification as mine foremen and assistant mine foremen was held in the Lehigh Valley Coal Company's Office Building, Wilkes-Barre, April 23 and 24. The Board of Examiners was composed of Frank Kettle, Mine Inspector; Sheldon Jones, Superintendent, Wilkes-Barre; George W. Raub, Miner, Plymouth; Patrick McGrane, Miner, Sugar Notch.

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

MINE FOREMEN

Raymond A. Gottshall, Askam; Joseph R. Jenkins, Ashley.

ASSISTANT MINE FOREMEN

Percy F. Bray, Millard Kressler, Idris Morgan, John Mainwaring, Nanticoke; Edward Collett, Charles Carey, Wilkes-Barre; Daniel Evans, Buttonwood; Thomas F. Mooney, Plymouth; William Roachford, Askam; David Richards, Edwardsville; Thomas Williams, Lee Park, Wilkes-Barre.